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ABSTRACT

A project was undertaken to redefine the role of vocational, technical, and adult education (VTAE) in economic development in Wisconsin. Included among the objectives of the project were the following: to produce a statewide plan for economic development identifying new linkages among business, industry, labor, and the VTAE system; to develop strategies for VTAE involvement in the plan; to outline the role of vocational education in technology transfer; to prepare information papers on topics such as job market trends, entrepreneurial activities, and barriers to quick response VTAE delivery systems; to identify future occupational training needs, and to conduct an economic development conference at the conclusion of the project to present the plan. During the project, a task force known as Commission '85 was formed to examine the role of VTAE in economic development. The commission met five times in the spring of 1983 to prepare a document entitled "A Plan for Economic Development: New Linkages Between Business, Industry, Labor and the VTAE System." The plan was presented at an economic development conference in June 1983. The task force continues to function as a working mechanism for interaction between government agency staff; vocational educators; and representatives of business, industry, and labor. (MN)

ED235361

FINAL REPORT

Funded and in cooperation with

The Wisconsin Board of Vocational, Technical and Adult Education
Dr. Robert Sorensen, Director

Conducted through

Center for Vocational, Technical and Adult Education
University of Wisconsin-Stout
Menomonie, Wisconsin 54751

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VTAE Economic Development Project

June, 1983

CE037194

Final Report

Project Number 30.106.150.313

VTAE Economic Development Project

Elizabeth Klitzke
Project Director

University of Wisconsin-Stout

Menomonie, Wisconsin 54751

June, 1983

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DISCLAIMER

The material herein was developed pursuant to Grant No. 30.106.150.313 with the Wisconsin Board of Vocational, Technical and Adult Education partially reimbursed from the allocation of Federal funds from the U.S. Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official State or U.S. Office of Education position or policy.

ABSTRACT

The purpose of this project has been to redefine the role of the VTAE System in economic development. Historically, the VTAE System has responded to the needs of business, industry and labor. A new economic climate has emerged in Wisconsin, however, that causes many business/industry/labor and VTAE leaders to question the traditional linkage between vocational education and economic problems.

Objectives of the project were to (1) produce a statewide Plan for Economic Development identifying new linkages between business/industry/labor and the VTAE System, (2) develop strategies for VTAE involvement in the Plan, (3) outline the role of vocational education in technology transfer, (4) prepare information papers on job market trends, entrepreneurial activity, barriers to "quick response" VTAE delivery systems, and (5) identify future occupational training needs. The final objective was to (6) conduct an Economic Development Conference at the conclusion of the project to present the Plan.

A task force known as COMMISSION '85 was selected as the vehicle which focused on the VTAE role in economic development. It was composed of a cross-section of business, industry, labor, government agency and VTAE leaders and was convened by the State Director. It met five times (January to May, 1983) to produce the Plan for Economic Development.

Outcomes of the Project included:

- A Plan for Economic Development: New Linkages Between Business/Industry/Labor and the VTAE System.
- June 1, 1983 Economic Development Conference and presentation of the Plan.
- A working mechanism (COMMISSION '85) for interaction between vocational educators, business/industry/labor and government agency staff.
- An active participation in COMMISSION '85 by representatives from a variety of state agencies, i.e., DOD and DILHR, as well as UW-Stout.

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Chapter 1

ECONOMIC DEVELOPMENT and the VTAE SYSTEM

A. Rationale of the Project

Wisconsin has been providing industrial training for youth and adults outside of a traditional secondary school or university setting for over 70 years. Responsiveness to the needs of business, industry and labor has long been a major goal of vocational education throughout the state. The traditional focus of meeting these needs has been on initial job-skill training, and job-entry skills for the unemployed.

A new economic climate has emerged in Wisconsin, however, that causes many business/industry/labor and VTAE leaders to question the traditional linkage between vocational education and economic problems. The problems confront us daily. High unemployment, high interest rates, aging industries, decreasing producivity, a competitive national and world marketplace, and an aging population all contribute to a weakened infrastructure.

Interrelated with this worsening situation is the impact of rapid change on both the VTAE System and business/industry/labor. New technologies have brought about a restructuring of the economy. David Birch reported in his speech to the Council of Upper Great Lakes Governors in March, 1982, that only 13 percent of the American work force is engaged in manufacturing of any kind. Of the 19 million jobs created in the 1970s, five percent were in manufacturing and 89 percent were in the service sector. Moreover, two-thirds of the replacement jobs were in firms of 20 or fewer employees.

This represents a shift from a manufacturing based economy to an information based economy. We are moving from work that requires muscles and dexterity to work that requires brains and knowledge; from hardware to

to software; from an independent economy to an interdependent economy; from physical capital investment to human capital investment.

A well trained labor force is one of the most important components of a productive business/industry. The thoughtware revolution of the late 1900s has forced a higher level of skill application. This, in turn, has major implications for the focus of VTAE programming in Wisconsin. The VTAE System has been actively involved in economic development in the past. However, the purpose this project has been to redefine the role of the VTAE System in economic development by focusing on job retention and job creation.

B. Objectives of the Project

The major objective of the project was to (1) produce a statewide Plan for Economic Development identifying new linkages between business/industry/labor and the VTAE System, (2) develop strategies for VTAE involvement in the Plan, (3) outline the role of vocational education in technology transfer, (4) prepare information papers on job market trends, entrepreneurial activity, barriers to "quick response" VTAE delivery systems, and (5) identify future occupational training needs. The final objective was to (6) conduct an Economic Development Conference at the conclusion of the project to present the Plan.

C. Procedure of the Project

The urgency of the economic situation in Wisconsin made it imperative for the VTAE System to address the issue of economic development with a singleness of purpose. Many divergent groups and agencies have economic

development as part of their mission; however these groups tend to act independently.

Therefore, a task force known as COMMISSION '85 was selected as the vehicle which focused on the VTAE role in economic development. It was composed of a cross-section of business, industry, labor, government agency and VTAE leaders and was convened by the State Director. It met five times (January to May, 1983) to produce the Plan for Economic Development.

An ad hoc advisory committee was formed to discuss the VTAE role in technology transfer. This group met three times.

Information papers were prepared for Commission members' use from the resource data base. Current newspaper and magazine articles relating to economic development were entered into the data base, and topical reports prepared.

Chapter 2

COMMISSION '85

In December, 1982, Robert Sorensen, State Director of the VTAE System, convened a task force of business and industrial leaders, VTAE economic development coordinators and administrators, and government representatives. He charged this group to produce a statewide plan for economic development which would identify new areas of cooperation and reaffirm existing linkages between business, industry, labor, and the VTAE System. The task force was called COMMISSION '85 - signifying Dr. Sorensen's intent that the statewide plan be in place and fully operational by 1985.

The Commission met monthly from January through May, 1983. Commission members were provided study materials drawn from a data bank of recent media coverage of international, national, and state economic development issues and were also exposed to a variety of related topics through presentations by Charles Dygert of the Ohio Vocational-Technical Research Consorita, Jim Johnson, retired 3M scientist, and Charles Denny, President of the Minnesota-based Magnetic Controls Company.

Drawing upon this body of information as well as their own experience and expertise in their respective fields, Commission members developed the Plan through successive drafts, working as a group and also submitting individual modifications by mail. The finished product is comprised of ten recommended goal statements, discrete actions implicit in the goals, and specific strategies for enactment of the goals.

Commission 85

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

December 20, 1982

Dear

The Wisconsin Board of Vocational, Technical and Adult Education has entered into an agreement with the University of Wisconsin-Stout to address the role of the VTAE System in Economic Development. The objective of this project is to develop a statewide Five-Year Economic Development Plan involving improved linkages between the VTAE System and Wisconsin's business and industrial communities.

The issue of economic development is serious and complex. No single segment can address it adequately. I am convinced, however, that a vital component of any statewide economic development program must be a stronger linkage between the VTAE System and business and industry. As a first step in strengthening this linkage, the VTAE System must address the issue internally, with a willingness to look at new ways in which its services can contribute to the economic health of Wisconsin.

Therefore, I am convening a special task force, to be known as COMMISSION '85, to be composed of a wide range of business and industrial leaders, VTAE economic development coordinators and administrators, and government representatives. I will charge the Commission to produce a Five-Year Economic Development Plan that identifies appropriate and stronger linkages between business and industry and the VTAE System.

It is my pleasure to invite you to serve as a member of COMMISSION '85. The first meeting will be January 20, 1983 at the Ramada Inn in Madison from 10:00 a.m. to 4:00 p.m. Three additional meetings are planned: February 17, March 24, and May 18, all at the Ramada Inn in Madison. A proposed membership list is enclosed.

Elizabeth Klitzke, as director of the Project will coordinate the activities of COMMISSION '85. Dr. Orville Nelson, co-director of the Center for Vocational, Technical and Adult Education at the University of Wisconsin-Stout, and I will co-chair the Commission.

VTAE

The Wisconsin VTAE System has a long tradition of positive response to the needs of business and industry. This foundation of partnership provides an excellent base from which to venture into new forms of linkage. I encourage you to agree to serve on COMMISSION '85. We need your particular expertise in tackling the issues confronting Wisconsin's economy, and the role that VTAE can play in alleviating the problems.

Thank you for considering this invitation. A response form and postage paid envelope are enclosed for your use in responding. Elizabeth Klitzke will be in contact with you in the next few weeks about the January 20 meeting.

Sincerely,

Robert Sorensen

Robert Sorensen, Ph.D.
State Director
Wisconsin Board of Vocational, Technical
and Adult Education

js

cc: Merle Bodine
Elizabeth Klitzke
Orville Nelson

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... over ...

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Commission 85

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

AGENDA

January 20, 1983
10:00 a.m. to 4:00 p.m.
(coffee at 9:30 a.m.)

CO-CHAIRMEN: Robert Sorensen and Orville Nelson

9:30 - 10:00 Coffee available

10:00 - 10:30
- Overview of Economic Development Project
  - Commission member's role
  - Purpose of four Commission meetings
  - Questions

  Elizabeth Klitzke
  Center for Vocational, Technical and Adult Education

10:30 - 11:30
- Major Trends in Wisconsin's Labor Market and Projections for the 80s

  August Cibarich,
  Department of Industry, Labor and Human Relations

11:30 - 12:00
- Summary of Greater Milwaukee Chamber of Commerce Report
- Plans for Synthesis of Strang, Plantes and DILHR Studies

  Laura Strain
  Milwaukee Area VTAE District

12:00 - 1:00 Lunch in Coffee Shop at Ramada Inn

1:00 - 2:00
- Current Linkages Between Business/Industry and VTAE
- Update on DOD/VTAE Initiatives, and Legislative Council Recommendations

  Robert P. Sorensen
  Wisconsin Board of Vocational, Technical and Adult Education

2:00 - 2:30
- Local Level Economic Development Activities

  Rod Pasch
  Moraine Park Technical Institute

2:30 - 3:30
- Brainstorming Session: Economic Development Needs in Wisconsin

  Orville Nelson
  Center for Vocational, Technical and Adult Education

3:30 - 4:00
- Charge for February 17 meeting of COMMISSION '85

  Elizabeth Klitzke
  Center for Vocational, Technical and and Adult Education

LOCATION: Ramada Inn (first floor dining room)
3841 E. Washington Avenue
Madison, WI 53704
(608) 244-2481

VTAE

AGENDA

Commission '85

February 17, 1983
10:00 a.m. to 4:00 p.m.
(coffee at 9:30 a.m.)

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

CO-CHAIRMEN: Robert Sorensen and Orville Nelson

9:30 - 10:00	Coffee available
10:00 - 10:15	• Review of Process - Information Papers - March 24 and May 18 meetings - June 1 Economic Development Conference Elizabeth Klitzke Center for Vocational, Technical and Adult Education
10:15 - 11:00	• An Overview of the Governor's Initiatives Concerning Economic Development Jim Flynn, Lt. Governor Department of Development
11:00 - 11:30	• Local Initiatives in Economic Development Howard Sonnenberg Indianhead VTAE District Pat LeSage Wisconsin Electric Power Co.
11:30 - 12:00	• Model for Technology Transfer Orville Nelson Center for Vocational, Technical and Adult Education
12:00 - 1:00	Lunch in Coffee Shop at Ramada Inn
1:00 - 2:00	• "What Can Be Done: The Ohio Model" Charles Dygert Ohio Vocational-Technical Research Consortia
2:00 - 2:30	• Discussion with Dr. Dygert
2:30 - 4:00	• Factors in Economic Development • Brainstorming Sessions: - VTAE Role in Economic Development Needs - Objectives of Economic Development Plan • Charge for March 24 meeting of COMMISSION '85 Orville Nelson and Harold Halfin Center for Vocational, Technical and Adult Education

LOCATION: Ramada Inn (first floor dining room)
3841 E. Washington Avenue
Madison, WI 53704
(608) 244-2481

AGENDA

Commission 85

March 24, 1983
9:00 a.m. to 4:00 p.m.
(coffee at 8:30 a.m.)

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

CO-CHAIRMEN: Robert Sorensen and Orville Nelson

8:30 - 9:00 Coffee available

9:00 - 9:30
- Review of Process
  - Handouts
  - April 21 and May 18 meetings
  - Brochure for June 1 Economic Development Conference
  - VTAE Brochure: Merle Bodine
  - Comments from Commission members
    Elizabeth Klitzke
    Center for Vocational, Technical and Adult Education

9:30 - 10:15
- "What Does the Future Hold for VTAE That Should Be Planned for Today?"
  Jim Johnson
  3M (retired)

10:15 - 10:45
- Discussion with Dr. Johnson

10:45 - 12:00
- Review Feedback on Goal Statements, Synthesize, Prioritize
  Orville Nelson
  Center for Vocational, Technical and Adult Education

12:00 - 1:00
- Lunch in Coffee Shop at Ramada Inn

1:00 - 1:30
- Barriers to VTAE Involvement in Economic Development and Strategies Used to Overcome Them
  Elaine Boyce
  Mid-State VTAE District

1:30 - 1:45
- District Consortium
  Harold Erickson
  Western Wisconsin VTAE District

1:45 - 3:30
- Develop One and Five-Year Objectives for Each Goal Area (small group sessions)
- Review Objectives Developed by Each Small Group
- Charge for April 21 Meeting of COMMISSION '85
  Orville Nelson and Harold Halfin
  Center for Vocational, Technical and Adult Education

LOCATION: Ramada Inn (first floor dining room)
3841 E. Washington Avenue
Madison, WI 53704
(608) 244-2481

VTAE

AGENDA

Commission 85

April 21, 1983
9:00 a.m. to 3:30 p.m.
(coffee at 8:30 a.m.)

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

CO-CHAIRMEN: Robert Sorensen and Orville Nelson

8:30 - 9:00	Coffee available
9:00 - 9:15	• Review of Process - Handouts - May 18 meeting - June 1 Economic Development Conference - Comments from Commission members Elizabeth Klitzke Center for Vocational, Technical and Adult Education
9:15 - 11:00	• Review Goal Statements for Economic Development Plan • Review and Refine Objectives Developed for Each Goal Orville Nelson and Harold Halfin Center for Vocational, Technical and Adult Education
11:00 - 12:15	• "The Role of Vocational-Technical Education and High Technology Industries" Charles Denny President and Chief Executive Officer Magnetic Controls Company
12:15 - 1:15	Lunch in Coffee Shop at Ramada Inn
1:15 - 3:30	• Begin Developing Strategies for Achieving Objectives in Plan • Discussion - Possible Format of Plan - Presentation and Dissemination of Plan - Implementation of Plan • Charge for May 18 meeting Orville Nelson and Harold Halfin Center for Vocational, Technical and Adult Education

LOCATION: Ramada Inn (first floor dining room)
3841 E. Washington Avenue
Madison, WI 53704
(608) 244-2481

Commission 85

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

AGENDA

May 18, 1983
9:00 a.m. to 3:30 p.m.
(coffee at 8:30 a.m.)

CO-CHAIRMEN: Robert Sorensen and Orville Nelson

8:30 - 9:00	Coffee available
9:00 - 9:15	• Review of Process - Handouts - June 1 Economic Development Conference - VTAE Economic Development Brochures: Merle Bodine - Comments from Commission members Elizabeth Klitzke Center for Vocational, Technical and Adult Education
9:15 - 10:00	• The Fox Valley Model for Economic Development William Ihlenfeldt Fox Valley Technical Institute
10:00 - 12:00	• Review Goal Statements for Economic Development Plan • Review Recommendations Developed for Each Goal • Brainstorm Strategies for Achieving Recommendations Orville Nelson and Harold Halfin Center for Vocational, Technical and Adult Education
12:00 - 1:00	Lunch in Coffee Shop at Ramada Inn
1:00 - 3:15	• Refine Strategies • Finalize Plan • Discussion - Format of Plan (Sample available) - Presentation and Dissemination of Plan Orville Nelson and Harold Halfin Center for Vocational, Technical and Adult Education
3:15	• Presentation of Certificates

LOCATION: Ramada Inn (first floor dining room)
3841 E. Washington Avenue
Madison, WI 53704
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VTAE

Chapter 3

A PLAN FOR ECONOMIC DEVELOPMENT: NEW LINKAGES BETWEEN BUSINESS/INDUSTRY/LABOR and the VTAE SYSTEM

The process for developing the Plan began in January with a brainstorming session to identify economic development needs in Wisconsin. A synthesized list of these needs was available for the February meeting. The Commission then brainstormed the VTAE role in meeting economic development needs and began to phrase goals for the Plan. The goals were subsequently mailed to Commission members; they were asked to accept, reject or modify the goals.

All tallies and comments about the goals were combined in a worksheet for use at the March meeting. The Commission then split into two small groups and worked to condense the goals and brainstormed action statements for each goal. These ideas were subsequently synthesized by project staff and again mailed to Commission members.

In April the Plan had begun to take shape. The goals were finalized; action statements were redefined and strategies for accomplishing the goals were brainstormed. The Commission continued to work in two small groups. In late April, project staff prepared a "next-to-final" draft of the Plan and mailed it to Commission members.

At the May meeting, work was done to refine the language, and to look for duplication and omission of strategies. The final version of the Plan went to the printer May 20 approximately ten days before the Economic Development Conference.

Commission 85

A PLAN FOR

ECONOMIC DEVELOPMENT: NEW LINKAGES BETWEEN BUSINESS, INDUSTRY, LABOR and THE VTAE SYSTEM

MADISON, WISCONSIN
JUNE 1, 1983

Wisconsin Board of Vocational, Technical and Adult Education

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State of Wisconsin \ BOARD OF VOCATIONAL, TECHNICAL & ADULT EDUCATION

ROBERT P. SORENSEN, Ph.D.
State Director
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MADISON, WISCONSIN 53707

June 1, 1983

The presentation today of A PLAN FOR ECONOMIC DEVELOPMENT: NEW LINKAGES BETWEEN BUSINESS, INDUSTRY, LABOR and the VTAE SYSTEM signals a new definition of the role of the Wisconsin VTAE System in economic development. Historically, vocational-technical education in Wisconsin has been commited to fulfilling the occupational training needs of students and employers. However, a declining economy and rapidly changing technologies in the work place have necessitated a fresh look at traditional modes of response to those needs.

Therefore, in December, 1982, I convened a special task force known as COMMISSION '85 and charged them with the task of producing a statewide plan for economic development. The culmination of their work is presented in this document and represents contributions from a wide range of leaders from business, industry, DOD, DILHR, UW-Stout and the VTAE System. I commend them for the new ideas which they have incorporated into the Plan and for their commitment of time and energy in an intense five months of work.

The development of the Plan is the first step in addressing a need for change. The real use of the Plan will be shown as the goals and strategies set out in this document are applied in actual programs and services. The success of the implementation of the Plan will depend on the initiative of many individuals and groups who are commited to making vocational-technical education an active partner in economic development activities in the State.

I challenge you to be a part of this initiative.

Sincerely,

Robert P. Sorensen

Robert P. Sorensen, Ph.D.
State Director

INTRODUCTION TO THE PLAN

The mission of VTAE is to provide Wisconsin citizens the opportunity to become prepared for gainful employment and to provide Wisconsin business and industry a trained work force. Shifts in job markets brought about by changing technology, international competition and a worsening state economy have made it imperative to review the ways in which the VTAE System is meeting its mission. The research project that initiated COMMISSION '85 and the resulting Plan for Economic Development are part of the continuing response of the WBVTAE to this imperative.

Background of COMMISSION '85

In December, 1982, Robert Sorensen, State Director of the VTAE System, convened a task force of business and industrial leaders, VTAE Economic development coordinators and administrators, and government representatives. He charged this group to produce a statewide plan for economic development which would identify new areas of cooperation and reaffirm existing linkages between business, industry, labor and the VTAE System. The task force was called COMMISSION '85—signifying Dr. Sorensen's intent that the statewide plan be in place and fully operational by 1985.

The Commission met monthly from January through May, 1983. Commission members were provided study materials drawn from a data bank of recent media coverage of international, national, and state economic development issues and were also exposed to a variety of related topics through presentations by Charles Dygert of the Ohio Vocational-Technical Research Consortia, Jim Johnson, retired 3M scientist, and Charles Denny, President of the Minnesota-based Magnetic Controls Company.

Drawing upon this body of information as well as their own experience and expertise in their respective fields, Commission members developed the Plan through successive drafts, working as a group and also submitting individual modifications by mail. The finished product is comprised of ten recommended goal statements, discrete actions implicit in the goals, and specific strategies for enactment of the goals.

Issues of Economic Development

Commission members were convinced by their study of trends in technology and future job markets that Wisconsin's economic development will be closely tied to new services, new modes of production, and new products. Some jobs will disappear altogether; some totally new ones will be created. Much work being done today will continue to be needed, but will be performed in ways that demand new training for beginning and continuing workers. Rapid obsolescence of products and processes is already forcing industry to anticipate and prepare for change as never before.

Thus, the first two recommended goals of the Plan are the identification and communication of emerging occupational training needs of business, industry, agriculture and service enterprises. (Henceforth, in the Plan, the shorter phrase, "emerging occupational training needs," is understood to encompass "emerging occupational training needs *of business, industry,*

agriculture and service enterprises.") Some major new training and retraining needs have already surfaced, and, to some extent, are being provided. For example, computers are now available at all instructional levels of our educational institutions. The private sector is spending billions of dollars annually on employee training/retraining, much of it using computers as a means and/or an end.

The technology revolution is so vast and promises such longevity, however, that our current response is clearly inadequate. As the Plan demonstrates, COMMISSION '85 feels that only with a concerted, cooperative effort by business/industry/labor and the VTAE/University/K-12 systems can Wisconsin muster the requisite job training for economic development.

The Commission recognized that along with the unknowns inherent in economic development planning, such as future training needs, other factors can be anticipated all too accurately. These are the barriers and inhibitors which inevitably complicate and retard change, such as inertia, bureaucratic structures, and inadequate communication.

The Plan reflects recognition of these barriers and includes specific strategies for overcoming them. For example, it addresses the very difficult issue of rebalancing VTAE programs, reallocating funds to growth areas and eliminating unnecessary programs. It also places a high priority on the necessity of communication among education/training institutions and among these institutions and the private sector.

The realization that rapid advances in technology are already having significant impacts on our economy and society inspires positive and negative reactions. New technologies promise economic growth and improvement in the quality of life, but, at the same time, irrevocably change familiar social patterns and the world of work we know today. Already, the revolution in technology is contributing to the dislocation of workers, and causing emotional and physical hardship. COMMISSION '85 studied and discussed these aspects of the rapid infusion of new technolgies in the American economy, and has addressed in the Plan particular issues of retraining displaced and obsolete workers, such as on-site and quick-start training.

Concomitant with documenting the surge in technological development, various observers of the economy have noted and applauded trends toward placing a higher value on the intelligence and creativity of workers, and toward motivating and encouraging workers to develop and use these attributes on the job. The members of COMMISSION '85 believe that the VTAE System, in which expertise in technology and in educating and training people are combined, is uniquely qualified to play a major role in the preparation of knowledgeable and productive workers for Wisconsin.

A STATEWIDE PLAN FOR ECONOMIC DEVELOPMENT

RECOMMENDED GOALS

Needs Identification

GOAL 1. Develop uniform statewide and district-level systems for building an information base to identify emerging and declining occupational training needs in Wisconsin. The system should involve the private sector and be compatible with the information systems of DILHR, DOD, GETO and other agencies.

GOAL 2. Establish mechanisms for communication among VTAE districts, employers, the university system and secondary schools. Develop a system for assigning responsibility among institutions.

Responding to Needs

GOAL 3. Develop processes and decision criteria for making VTAE schools more adaptive and responsive to future changes in occupational needs.

GOAL 4. Improve the system's capability to provide high-quality job training that enables workers to use existing and future technology.

GOAL 5. Provide equipment that will ensure appropriate instruction for current and emerging occupations.

GOAL 6. Develop mechanisms to ensure that administrators and instructors are knowledgeable about current technology and its application.

GOAL 7. Develop processes to provide quick start and non-credit offerings as well as technical assistance to meet changing needs of enterprises and entrepreneurs.

GOAL 8. Develop a system to provide critical, high-cost programs on a statewide basis.

Evaluation

GOAL 9. Evaluate the effectiveness of VTAE services provided to meet economic development needs.

GOAL 10. Identify and eliminate impediments and barriers to accomplishment of goals.

NEEDS IDENTIFICATION

Recommended Goal 1.

Develop uniform statewide and district-level systems for building an information base to identify emerging and declining occupational training needs in Wisconsin. The system should involve the private sector and be compatible with the information systems of DILHR, DOD, GETO and other agencies.

A. Set up an ongoing study of new technologies to identify emerging skill training needs of Wisconsin enterprises.

B. Inventory the existing work-force skills and knowledge necessary to:
   - assist current firms to become more productive, stay competitive and expand.
   - assist existing firms to utilize high technology skills that are complementary to current occupational/skills mix for possible for diversification.
   - identify factors in the quality or skill level of the work force needed to attract high technology firms to the area.

C. Coordinate data collection and processing with other agencies.

D. Design effective and appropriate methods for processing and disseminating results to appropriate recipients in VTAE districts, secondary schools, government agencies, and UW-System.

Recommended Strategies

1. Identify a specific office on the State VTAE Board Staff to coordinate the development of this information base and to implement the collection and dissemination of the data to all users.
2. Highlight declining job-skill areas to facilitate the development of retraining plans and the elimination of irrelevant curricula and training programs.
3. Provide a continuously updated VTAE technical directory system.
4. Use a future-oriented process to identify major societal trends and discontinuities, considering factors that influence occupations, such as qualitative, quantitative, technolgical, social (human) and time (near future/distant future).
5. Carefully review and make more effective use of data already available.
6. Solicit input from business/industry on emerging occupational training needs.
7. Solicit input from workers on emerging occupational training needs.

Recommended Goal 2.

Establish mechanisms for communication among VTAE districts, employers, the university system and secondary schools. Develop a system for assigning responsibility among institutions.

A. Target and put VTAE economic development activities in priority. Use this information to determine directions to be taken for expanding communications among VTAE districts.

B. Carry out joint planning of service delivery among secondary schools, VTAE and UW-Systems.

C. Inform business/industry/labor of the services available from VTAE districts.

Recommended Strategies

1. Designate an executive level staff position at each district with full-time responsibility for economic development.
2. Establish communication techniques such as networking.
3. Join or encourage the development of a local(s) Economic Development Council comprised of representatives from business, industry, education, labor, governmental agencies and entrepreneurs.
4. Develop a new system to market VTAE services. Upgrade present systems.
5. Develop various modes to provide effective communication between business/industry and VTAE regarding new technologies.
6. Provide appropriate feedback on remedial needs of students.
7. Grant credit for prior education and training.
8. Use ongoing information base to strengthen joint planning in curriculum development and revisions.
9. Set up teams to coordinate programs of secondary, VTAE and UW-System.
10. Reduce structural barriers that impede individuals from moving from one program area to another within or between systems.

RESPONDING TO NEEDS

Recommended Goal 3.

Develop processes and decision criteria for making VTAE schools more adaptive and responsive to future changes in occupational needs.

A. Review and revise procedures which are based on an assumption of stability and replace them with procedures which assume continuing change.

B. Develop and use a strategic plan in each district to re-examine priorities.

C. Design decision criteria for facility and equipment acquisition which recognize the need for maximum flexibility in accommodating change.

Recommended Strategies

1. Provide a training program to help administrators and faculty learn how to design flexible systems.
2. Encourage those who set policy to review and evaluate flexibility of VTAE services.

Recommended Goal 4.

Improve the VTAE system's capability to provide high-quality job training that enables workers to use existing and future technology.

A. Develop a variety of competency-based instructional methods for vocational education that provide access to training for existing and dislocated workers.

Recommended Strategies

1. Determine the vocational and technical programs which will be aided by use of computers and encourage that use.
2. In addition to recognized occupational competencies, place a high priority on teaching analytical skills that will help workers adapt to changing processes in the work place.
3. Develop "transportable" education programs to meet needs in several geographic areas.
4. Develop co-op/intern programs with industry to make the training as direct as possible.
5. Design new vocational and technical programs which are competency-based or can be easily placed in an individualized format.

B. Identify and implement on a statewide basis, math, science, reading, and communication skills which are needed in existing and emerging occupations.

1. The heads of the VTAE, UW, and DPI will appoint district commissions composed of DPI, UW, and VTAE decision makers to ensure that all students receive sufficient communication, mathematics, reading, and science skills to allow them to continue their education or succeed in gaining job entry level employment.
2. Encourage the Department of Public Instruction to require competency testing for high school graduates.

C. Using the ongoing vocational information base, put the VTAE System's programs and services in priority and allocate resources to meet emerging needs. Eliminate curricula which are meeting obsolete needs and reallocate those resources.

Recommended Strategies

1. Strengthen the program discontinuance process.
2. Reduce or discontinue state aids for programs which cannot meet reasonable, fair or equitable criteria for program evaluation, based on employability of graduates and impact on the community.
3. Provide higher state aids for high priority programs.

4. Expand the concept of sharing VTAE resources throughout the state in response to immediate needs of agricultural, business, industrial, service organizations.
5. Identify new programs which respond to emerging technologies appropriate to Wisconsin.
6. Identify the impacts of the changing labor market and new technologies on all VTAE programs and training.
7. Reduce enrollment in programs which will become obsolete.
8. Develop a standardized system which pays a portion of state aids for districts that succeed in meeting the needs of local enterprises and entrepreneurs.

Recommended Goal 5.

Provide equipment that will ensure appropriate instruction for current and emerging occupations.

A. Identify alternative funding strategies to secure equipment that is compatible with that used in business/industry.

Recommended Strategies

1. Pursue private foundation grants.
2. Share equipment with public/private sector.
3. Utilize prototype/demonstration equipment for training.
4. Develop on-site training.
5. Explore rental/lease arrangements.
6. Develop a barter system in which services/human resources can be exchanged for updated equipment utilized either on the campus or on-site.
7. Increase amount of federal funds set aside for high technology.
8. Contact manufacturers and offer to act as a test, repair and reliability center.
9. Identify simulation techniques currently used in training institutions, private sector and the military.

B. Provide sufficient microcomputers in each VTAE district to enable each student to develop minimum competencies necessary to complete a vocational or technical program.

Recommended Strategies

1. Provide relevant software for students to use on a microcomputer system.
2. Configure district main frame computer(s) so that microcomputer systems owned by the district and/or student can be networked with the main frame.
3. Build computer literacy development and computer assisted instruction into all VTAE programs.

Recommended Goal 6.

Develop mechanisms to ensure that administrators and instructors are knowledgeable about current technology and its application.

A. Analyze district certification data to determine if VTAE teachers and administrative staff are knowledgeable in new and emerging technologies in their fields.

Recommended Strategies

1. Provide funds and opportunities for staff development so that instructional and administrative staff may be kept abreast of emerging technology.
2. Work with business/industry to create a system of staff development including internships in business, industry and service organizations for all VTAE instructors and administrators on a five-year basis and encourage similar internships from business, industry and service organizations in the VTAE System, (i.e., on-site training).
3. Work with UW-System in providing innovative experiences and appropriate credit offerings.

B. Develop flexible bargaining agreements so that each VTAE district can make staff available for technical assistance and on-site training to business and industry.

Recommended Strategies

1. Work with the District Board's Association to ensure this flexibility in all 16 districts.
2. Develop opportunities for teachers to retrain when their fields become obsolete.
3. Continue strategies that provide staff development programs which ensure that staff remain current in technical as well as instructional competencies.

Recommended Goal 7.

Develop processes to provide quick start and non-credit offerings as well as technical assistance to meet changing needs of enterprises and entrepreneurs.

A. Provide technical assistance and specialized training in the use of existing VTAE technology and laboratory equipment. This technical assistance would be available to employers and entrepreneurs in the district. For the technology associated with statewide programs, the technology would be available for all state residents.

Recommended Strategies

1. Provide funds for specific employer training needs.
2. Prepare a catalog of available equipment and resources in VTAE.
3. Publicize technical assistance available in the VTAE System.
4. Conduct special workshops/training sessions on new technology.
5. Include technical assistance in teachers' contracts.

B. Provide quick start funds to facilitate effective and rapid response to changing skill needs and unexpected needs in business, industry, agriculture, and service organizations regardless of location and size of the groups involved.

Recommended Strategies

1. Develop more flexible district organizations which will allow vocational educators to quickly gather and assemble courseware, software, and learning activities tailored to specific job training needs.
2. Appropriate funds and other resources at the district level for customized training.
3. Include funding for customized training/equipment in state budget.

C. Whenever possible, use district properties as economic development tools for new business development and/or recruitment of business/trade associations which would benefit by their proximity to a district facility.

Recommended Strategies

1. Encourage business/industry entrepreneurs to utilize the facilities and expertise of the UW and VTAE Systems to promote applied research for the creation of new jobs.
2. Participate in local committees, professional associations, and other groups which monitor technological change and assess its implication for business and industrial practice.

D. Assist in the transfer of new technology by training and retraining workers to work with it and by providing information for innovators.

Recommended Strategy

1. Link districts with universities and business and industry to provide incubator space for new and expanding businesses and industries.

Recommended Goal 8.

Develop a system to provide critical, high-cost programs on a statewide basis.

A. Locate high-cost programs at sites determined by the Wisconsin Board of VTAE. Make components of those programs available to meet specific needs of other parts of the state.

Recommended Strategies

1. Explore supplemental funding sources.
2. Develop a process which will encourage the hiring of high-cost technical instructors.
3. Develop a mechanism for strategically locating high-cost programs in specific districts.

B. Develop linkages that would locate elementary components of programs in a number of districts but would locate the final component and expensive equipment in a single district.

Recommended Strategies

1. Send students to a specific location to finish the program.
2. Send instructors to specific locations for upgrading of skills.
3. Utilize alternative instructional delivery systems such as teleconferencing and computer-assisted instruction.
4. Rotate equipment and curricula.
5. Eliminate financial barriers that discourage students from studying outside their local district.
6. Encourage the UW and VTAE Systems to share shops and laboratories for UW research and teacher training, for VTAE technical instruction and for business and industry upgrading in high technology areas.

EVALUATION

Recommended Goal 9.

Evaluate the effectiveness of VTAE services provided to meet economic development needs.

A. Develop a continuous monitoring system to evalute how well the VTAE System helps meet economic development needs related to its mission.

B. Evaluate whether

- needs identified in the information system were critical needs.
- programs are meeting identified emerging occupational training needs.
- communication systems are effective.
- delivery systems developed in response to communication systems are effective.

Recommended Strategies

1. Develop both internal and external evaluation systems, on a periodic basis.
2. Seek input from business/industry.
3. Evaluate placement of graduates.
4. Develop a user evaluation system which can be uniformly adopted by each district.

Recommended Goal 10.

Identify and eliminate impediments and barriers to accomplishment of goals.

A. Assess and modify the state aid formula to provide more flexibility in response to employer needs.

B. Review all policies, laws and factors that restrain the VTAE System's response to identified occupational training needs.

Recommended Strategies

1. Assign appropriate staff to assess internal and external impediments.
2. Conduct legislative review of legislation affecting VTAE.

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State of Wisconsin

BOARD OF VOCATIONAL, TECHNICAL & ADULT EDUCATION

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EDUCATION DISTRICTS

Acknowledgments

In September 1982, the Wisconsin Board of Vocational, Technical and Adult Education entered into an agreement with the University of Wisconsin-Stout to address the role of the VTAE System in economic development. The objective of the project was to develop a statewide Plan for Economic Development involving improved linkage between the VTAE System and Wisconsin's business and industrial communities.

Because the issue of economic development is broad and complex, it was not the intent of the project to address the wider view. Rather, the project focused on an internal VTAE view, attempting to suggest new ways for strengthening the linkages between business, industry, labor and the VTAE System. COMMISSION '85, a task force appointed by the state director, was the vehicle through which this was accomplished.

Recognition for support and assistance throughout the project is given to Robert Sorensen, State Director, and Merle Bodine, Director, Bureau of Community and Economic Development of the WBVTAE. Special thanks are given to Orville Nelson and Harold Halfin, Co-Directors of the Center for Vocational, Technical and Adult Education at the University of Wisconsin-Stout for their professional leadership and expertise in the development of the Plan.

Above all, the Plan for Economic Development would not be a reality without the contributions of the 26 members of COMMISSION '85. Their active involvement in developing the goals and strategies of the Plan has made it possible.

Elizabeth Klitzke
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Excerpts from COMMISSION '85 Presentations

"In the 1800's, agriculture, forestry, and mining were the major industries. The prevailing economic theory was that all other industries were secondary and dependent upon this base. The decline in farm employment, and the transition from cottage industry to a manufacturing economy was a difficult one requiring major cultural change.

We may now be in the midst of another such change. Manufacturing has been declining as a share of total employment, and with robotics it may be declining in absolute numbers. The current recession may be part of a major cultural change that could require development of new economic theories."

August Cibarich
Department of Industry, Labor
and Human Relations
January 20, 1983

"Now the issue is (and this may be as hard for you to swallow as it was in our state) 98 percent of our work is done at the plant site. This was very difficult for educators in our state to live with. They wanted those factory workers in their facilities and their schools. The reason that can't be done is because local schools do not have the equipment necessary to do the training. One plant in Toledo, Ohio has one machine that's two football fields long. We can't duplicate that in vocational education, so we had to convince that plant to *not* produce a product for two months while we trained 133 people how to run that machine. For us to be really effective, we are going in the plants and factories and working right there with them."

Charles Dygert
Ohio Vocational-Technical
Research Consortia
February 17, 1983

"The new jobs are going to be created by entrepreneurs willing and able to take risks; and I think educators therefore, have to be willing and able also to take risks.

The unwillingness to rebalance programs may be in part the inertia of large institutions that are locked in tradition, tenure, self-satisfaction or bureaucracy. But in part, it is lack of resources to do the job. This is the responsibility of all of us.

We must be producing a technically literate work force. We cannot tolerate an emerging work force that can't read, write or do simple arithmetic. We have to accept the fact that computer literacy is important. People are going to have to know how to use computers and people are going to have to know how to repair them, among other things."

Jim Johnson
Director Physical Science
Research Lab, 3M (retired)
March 24, 1983

"Today, not many great ventures are created by one individual. Increasingly, the process says that a whole host of people, at all levels in the company, must be extremely perceptive to their external environments and have the capacity to unlock their imaginations as to how the needs of this external environment can be better met. This doesn't imply a quantum improvement—like suddenly conceiving a transistor. It really means doing everything we do a little better—always being in a mode to scan the horizon for the latest techniques that may be applied to the improvement process."

Charles Denny
President, Magnetic Controls Company
Bloomington, MN
April 21, 1983

Chapter 4

ECONOMIC DEVELOPMENT CONFERENCE

The Plan for Economic Development was presented formally June 1, 1983 at the Economic Development Conference held in Madison at the Sheraton Inn. Approximately 160 attendants from business, industry, labor, governmental agencies, UW-Stout, and the VTAE System heard keynote presentations by Charles Dygert, Director of the Ohio Vocational-Technical Research Consortia and Earl Joseph of Anticipatory Sciences, Inc., Minneapolis.

Jim Flynn, Lt. Governor and Secretary of the Department of Development, brought greetings from the governor and spoke of the relationship of labor training to economic development.

Merle Bodine, Director of the Bureau of Community and Economic Development presented the Plan and Robert Sorensen, State Director, spoke on strategies for implementing the Plan. A panel discussion followed, giving reaction to the Plan from Competitive Wisconsin, Inc., the District Director's Association, industry (Allen-Bradley Company) and labor (AFL-CIO). Pat LeSage, a member of COMMISSION '85 moderated the panel.

Conference evaluations showed that participants gave the conference an overall rating of 4.3 (1 = poor, 3 = good, 5 = excellent), a rating of 4.5 for keynote speakers, and a rating of 3.7 for conference materials. Eighty one percent of the participants said they came to the Conference because they were interested in the Plan for Economic Development.

ECONOMIC DEVELOPMENT:

NEW LINKAGES BETWEEN BUSINESS, INDUSTRY and the VTAE SYSTEM

June 1, 1983

9:00 a.m.	*Welcome* Robert P. Sorensen, State Director Wisconsin Board of VTAE
9:15	*Greetings from the Governor and the Department of Development* James Flynn, Lt. Governor
10:00	*Leadership in the Educational Delivery of Economic Development Service* Charles Dygert, Director Ohio Vocational-Technical Research Consortia
11:00	*A Plan for Economic Development as recommended by COMMISSION '85* Merle Bodine, Director Bureau of Community and Economic Development Wisconsin Board of VTAE
12:00	*Luncheon* *What Next: How Will the WBVTAE Implement the Plan for Economic Development?* Robert P. Sorensen, State Director Wisconsin Board of VTAE
1:30 p.m.	*Reaction to the Plan for Economic Development: A Panel Discussion* Patrick LeSage, Moderator - Wisconsin Electric Power Company Harry Franke - Competitive Wisconsin Dwight Davis - North Central VTAE District Leon Polczynski - Allen-Bradley Company Jack Reihl - AFL-CIO
2:45	*Break*
3:00	*Alternative Futures for Vocational Education and Economic Development* Earl Joseph, President Anticipatory Sciences, Inc.

Economic Development Conference Participants
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Chapter 5

RELATED PROJECT ACTIVITIES

A. Resource Data Base

A computerized data base of current items related to economic development was updated at regular intervals throughout the project. Sources included the Milwaukee Journal and Sentinel, St. Paul Pioneer Press, Wall Street Journal, Capitol Times, Business Week, Forbes, Inc., Wisconsin Business Journal, Newsweek, High Technology.

Software for the data base was PFS Report; an Apple computer processed the information. A list of identifiers was developed, so that when a particular topic was chosen, a list of all clippings relating to that identifier could be printed.

Project staff used this topic list to select sources for information papers. Nine papers were prepared using this method.

B. Technology Transfer

An ad hoc committee met three times to discuss the role which VTAE can play in technology transfer. Factors of technology transfer were identified, areas of potential university and VTAE assistance were explored, and a model for technology transfer was developed. This model was subsequently presented to COMMISSION '85.

Chapter 6

RECOMMENDATIONS

The Plan for Economic Development: New Linkages Between Business/Industry/Labor and the VTAE System as developed by COMMISSION '85 and presented June 1, 1983 to the Economic Development Conference marks a new definition of the role which VTAE can play in the state's economic climate. Implementation of the Plan will not be automatic; leadership from district and system-wide decision makers is essential to maximize the momentum generated by COMMISSION '85.

Two recommendations are made for implementation of the Plan:

(1) to continue the charge of COMMISSION '85, to plan, facilitate and followup implementation of the Plan. COMMISSION '85 has served a valuable function in communicating economic development issues to the wider VTAE community. Their assistance in guiding implementation of the Plan will provide continuity.

(2) to design and activate a computerized statewide information base of emerging and declining occupational training needs. The information base could be organized around the concept of a computer network with on-line access possible from any microcomputer using DOS or CP/M operating systems. The rapid shrinking of the product life cycle from 15 years to three years or less, makes it imperative that the VTAE System have current information about emerging and declining occupational training needs. VTAE programming must be built upon a base of consistent and uniform information.

The methods for achieving implementation of the Plan should be collaborative in nature, drawing upon the consensus of groups to spearhead initiatives. This leadership style is consistent with current trends toward decentralization and participatory management in the U.S.

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Appendixes

A. Charles Dygert Transcript

B. Jim Johnson Transcript

C. Charles Denny Transcript

D. Information Papers

E. Technology Transfer Model

F. Technology Transfer Advisory Committee

G. Conference Evaluation Instrument

"What Can Be Done: The Ohio Model"
Charles Dygert
The Ohio Vocational-Technical Research Consortia
Presentation at COMMISSION '85, February 17, 1983

I'm here to talk about the charge I was given some three years ago. Three years ago in our state we began to feel the impact of a recession and we also began to feel the impact of something called "claims made by the states in the south--the sunbelt" and about their great ability to train. And I want to tell you right off the bat, that I've explored that, and they have no better ability to train that you and I do--in Ohio and/or Wisconsin except they "hyped" theirs a little bit better than we did. The reason I was employed is because one of our major industries went to South Carolina because they claimed South Carolina could train their technical help better than Ohio, and the problem was that Ohio simply wasn't telling anybody. I can promise you that was a significant political "faux pas" in our state. A lot of heads fell over that one. As a matter of fact, in the last gubernatorial campaign, one of our gubernatorial candidates kept bringing "that" issue up--that Ohio's vocational and technical and university system allowed one of our industries to leave.

So three years ago when I was hired, I was given that as a charge. Now, the reason I was hired, I suppose, was because my background is manufacturing even though I am an industrial educator; but I was very pleased that they asked me to take the job. As a matter of fact, they didn't ask me to take it; they told me to take it. It was one of those kind of issues. They gave me a job that had never been there before, and it was my job to pull together the resources of education in Ohio to make it part of economic development. But I found right away that I was going to have to school myself in economic development because while I thought I understood economic development, I found out it's a very complex business. I've found the majority of my initial time was spent on understanding economic development and how it works.

I just thought I'd give you a quick overview on how it does work in our state, and I'm sure it's probably similar to this state. In our state we have something called the OEDC, which is called the Ohio Economic Development Council, a private sector organization established by legislation in our state. They are the only agency to receive something called "business confidentials". A business confidential is some piece of information coded about some business in our state. The Ohio Economic Development Council receives business confidentials and keeps active lists of business confidentials that are then given to our Department of Development. We have a staff of 300 people in our Department of Development; six industrial development specialists in the Department of Development plus a whole slew of other people that do economic development things in our state. I think it's important to know that in our state it's a private sector council that receives business confidentials prior to our Department of Development.

We thought in our state that the Department of Development and educational facilities were working very, very well together. We felt that the industry knew that we were out there. Yet, as I began exploring I found out that the industry didn't know we were there. They knew we were there, except they didn't know how to access or utilize our resources and services. So my job right away was to (1) become part of economic development in Ohio. I think I did a good

job of that; those folks know me; I spend most of my time in the Department of Development. The other issue (2) was to be an Ad Hoc member of the OEDC, the Ohio Economic Development Committee. I am the first educator to ever serve on that committee; I am the first educator to have easy and upfront access to business confidentials. I realized right away that while we have local industry and local education communicating through advisory committees and other kinds of processes, that the local business community did not rely on the local educational community when it's time to make business decisions. They were counseled or brought into the picture after the decision was made. I felt that at the state level if I was going to begin to work at the business confidential level that we need to have a local structure so they would work at the business confidential level also. That was my initial objective, to somehow get education into economic development activities.

I began looking around the state of Ohio at 245 local economic development specialists. They are from Chambers of Commerce, utilities and so on; it's an organization called the Ohio Development Association and it's regional in our state. It's composed of two or three counties in our state. In some major metropolitan areas it may be one county. These are people who work together in economic development areas. I found out that out of all of those 245 economic development specialists in over 45 state committees, there were no educators on those committees. In other words we were still on the outside looking in, so I realized that we needed to be somehow in the inside, being part of that planning process.

How we formed and decided on the delivery system for educational access in our state was really by accident. We had a German firm moving into the Toledo, Ohio area so I went to that community. I made a call upfront; I said to the local technical college, I would like to meet with you for lunch. Well, I found out that you don't do that; that when there is an industry going into Toledo you just don't contact one educational institution, you had better contact them all. By the time I finished setting up a meeting, we had thirty-five people. Thirty-five people felt they should be in that room having something to say about this new firm and delivering training access and training resources. So that was really our first committee meeting. We all sat around a table and they looked at one another and said, "gosh, I haven't seen you in two years!" Here were people delivering training resources in a major metropolitan community like Toledo, Ohio, yet these people never talk to one another. They saw one another at state meetings and they realized maybe we ought to meet together once in a while over lunch. That was the establishment of the first of what we call the Vocational-Technical Resource Committee. That was the very first meeting, and at that time they named a high-tech machine-tool firm that was to locate in Ohio.

(The Department of Development "cuts deals" with industries if they locate in our state. Now part of the arrangement was to allow a sum of money for training. Well nobody knew what kind of training they wanted but that sum was put into something called the inducement agreement, the inducement agreement is a written document given to a company. If you indeed locate here, here's what you will get. So that was the last time we had just money placed in an inducement agreement because now we do planning. We try and help an industry plan what kind of training needs they really have, put an accurate assessment of cost, and develop something called a contract.)

The first thing the committee decided was that if we are going to have a committee of education resources it should be a chief executive officer of that school district, the president of the community college or the local superintendent of schools. It should be somebody who is an authority and doesn't have to check with anybody else to make decisions. We decided that it should be a chief executive officer. The original committee in the Toledo area from five counties was made up of 35 chief executive officers in the education community.

The Chambers of Commerce around our state are heavily involved in economic development, so we involve the Chambers of Commerce. The Vocational-Technical Resource Committee started with a little bit of infighting, educators arguing with each other; we found out that there is something called turfmanship in education. I didn't really know how severe it was until I tried to bring people together and get them to think collectively. I found out that it sounded good, but to get them all down at a table took a long time to get some underlying agendas out of the way. We made a pact, that we, educators, would do our fighting away from the business community. So things do drop by the wayside, educators do get used to working with one another and it has worked very, very well.

We went about establishing 23 such districts in the state of Ohio. I guess you have yours carved into 16 operational districts. After I got these districts formed I began receiving business confidentials where there was training needed so I called the local voc-tech school and said, "go get them" and a week later someone from the Department of Development called me and said that no one showed up. I called the schools and they said, "well, we are going to get there eventually." I said, "well, when?" "Well, we are busy people," and it dawned on me that our folks at the local level <u>are</u> busy; they have their jobs already cut out. Believe it or not, you're going to find out when you get into this business, this <u>is</u> full time business.

I went about the task of trying to find money to hire 23 executive directors for all of these 23 consortia committees. I did find some money; I begged, quarreled and everything else, and got a little pressure from the governor. I did find enough money to place a staff of 23 people in our state on-site to work for each of these consortia districts. Their job was to be an economic development outreach person, not a doorknocker. Their job was not to go knock on doors, their job was to work with the economic development specialists in that geographical area, to go on visitations to be visible. It worked very, very well; as a matter of fact, I think 13 of the 23 are actually housed in Chambers of Commerce. We have 13 major Chambers in our state, major city areas as many of you know. So I have these people housed in Chambers of Commerce.

As a matter of fact, many of them carry an education business card, and a business card from the Chamber of Commerce. We were worried about that at first and now we realize that maybe that's very, very good because we found that the business community accepts our people. When he visited a firm by request he always got to see the VP or the chief executive officer simply because he came from the Chamber base even though he clearly was an educator; he was our former director for vocational education in the Toledo city schools. So we found out that that was a stroke of genius. If one thing contributed to our success it was where we internalized and did work with every Chamber in the state of Ohio. We work very closely with the state Chamber and so we pass ourselves off as part of their program. We're an economic development spin-off.

We began working in new and expanding industry and added a category called retention. If an industry had some needs we worked in the area of retention. At the beginning I didn't have time to sit down and write and plan; in other words I had to get the thing rolling and start spending money. The legislature did finally give us a ten million dollar budget over the biennium. We are asking for $14 million this next biennium and probably will get it because our best guestimate is it takes around $7 million a year to deliver the educational services we are talking about.

There are some key things you need to know about our educational services. I found out why the business community doesn't go to the voc-tech school or to the community college and knock on the door and say, "we need this, that and the other thing". I visited with the local industrialists and said, "When you have a need on laser, optics or whater it may be, where do you go for those needs?" Well, he said "we have something called a resource file," and he showed it to me. It was a nice file cabinet in the corner, he said "I have all of my resources located by subject." I said, "Let me look at one." We looked under laser technology and I looked under laser and here was a file where there was resource after resource after resource. I found out that in the entire file cabinet there was not a single vocational-technical school filed as a resource. Not a one.

That really wasn't our fault, it's simply that we in vocational-technical education don't do this kind of thing. We have courses and course offerings. What we found out was that the reason we weren't being used was because the private sector who produced private materials were "out gunning" us because they had the PR. They're the ones sending the mailing out to businesses.

We realized that there is something called the National Training Marketplace Directory. It's published by ASTD. This contains over 1,600 resources for vocational-technical resources in this country. There are no schools in here. Their only listing is the National Center for Vocational-Technical Education, other than that if I were an industrialist looking for something called integrating skills, language training, labor relations training, whatever it might be, management by objectives, laser controlled, welding, I would look down here and find a private vendor.

I found out that the private vendors are doing a good job getting their information into the business community and the business community may be somewhat misinformed because they begin to believe that this was the only place that you could get training. They knew they could take a student and send them over to the vocational-technical school and get them trained in machine tool or whatever. They did not know what we would be able to go into their business and industry and help them make some decisions about planning and training that they certainly would need. So that was my first objective, to make our 23 people and our services very visible, not necessarily in Public Relations. The best way was to work with the economic development people who are already working the business community. We are an arm in that activity and that has worked since then because so far just in the last two years we have invested over $7 million in direct application. This is a list of companies we are working with already and so far we are working with 137 firms in the state of Ohio and not all of them are new and expanding. Our guideline is if you establish ten new jobs you have our help. We will do a lot of different kinds of things and I will describe them after a bit and I'll answer questions as to what we really do.

The best way to describe a typical situation was our first big project with a large corporation in Dayton. The plant closed because of severe labor difficulties. The labor management situation was absolutely fierce and the company made the decision to close the plant. They now manufacture other products. We began at the front end; we weren't called in afterwards; we were at the planning level. Two years before that plant ever opened its doors, we were planning the training effort. We decided that all 6,000 returning employees were coming back through the labor route, and we agreed to retrain these people. We took 14 of their best supervisors and we turned those 14 people into top-notch trainers. In other words, the company demanded that all returning employees go through 80 hours of instruction.

A lot of it had something to do with quality control circles, I'm sure you have heard of that. They decided to go with quality control circles to help alleviate the labor-management difficulties. We put the team through 14 weeks of intensive training and brought them up to scope to be able to retrain the returning employees. Everybody returning to the plant, including secretaries and plant managers, went through the training effort. Even the plant manager went through this sensitization process of how to get along and how quality control circles work. We invested state dollars in that effort over a two and one-half year period. A lot of people ask, isn't that subsidizing industry? It really isn't because we have to stay in competition with other states, particularly in the south. We figured with returning 6,000 people to the employment lines, the state of Ohio got their money back in nine months, with benefits!

It was one of our best efforts. We hired a full-time on-site coordinator, a state employee who lived right at the plant. He carried the highest priority badge you can have. He was right next door to the plant manager and it was a high priority operation. Our training efforts were right at the helm of the entire new delivery system and planning the whole new plant. We've been over there for three years. We are still there and we intend to stay with them until they feel they are ready. This company's highest quality control mark is "145". The plant at Dayton has consistently, month after month after month, had a 145 quality control record. There are similar products being produced in two places. The other plant closed down and we feel that education and business working together in this particular effort made a significant contribution to the city of Dayton as well as to the client corporation.

We were concerned that this upturn in employee attitude was a Hawthorne effect, because people tend to respond when they are being experimented upon. It's been two years now since the program; the Hawthorne effect generally peters out after six months. So we feel that the Hawthorn effect is not the issue, the quality control circles employee involvement is a heavy issue. We are finding that because of the initial investment a lot of the firms that we have worked with want the educational community to offer things like quality control circles. I will share some other things that they would like to have from us also, but it was a major effort and we are very proud of that effort. It really gave us a chance to cut our teeth on a whole factory involved with the entire educational community in the Dayton area. So that was the beginning of our effort and as I mentioned now we are working with 137 firms and have expended over $7 million so far in just a year and a half for a local industry to have educational access.

Here is the key difference to what we do versus what the vocational-technical school does. We had to make it clear to the business community; we call our program "intensive short term". In other words, our program is designed for three months or shorter. Many industries don't understand the role of the vocational-technical institute, that the vocational-technical school produces entry level long term learning skills and that it takes two years at the vocational-technical school to prepare somebody. What we are doing is something called intensive short term. Many of our industries got confused, they wanted us to keep on involving ourselves after the intensive short term start up effort. We are saying that's when apprenticeship and all the other programs emerge that we back off, once you get the plant on-line ready to function. We want to be sure, so we are spending a lot of time helping the business community understand what short term intensive means; it means a program of three months or less and that could be three months at 40 hours a week as far as we are concerned. Our investment is generally around $11.00 per instructional hour.

Now the issue, and this is going to be hard to swallow and it was hard in our state, 98 percent of our work is done at the plant site. This was very difficult for educators in our state to live with. They wanted those factory workers in their facilities and their schools. The reason we can't do that is because our local schools do not have the equipment necessary to do the training. One plant in Toledo, Ohio, has one machine that's two football fields long. We can't duplicate that in vocational education, so we had to convince that plant to not produce a product for two months while we trained 133 people how to run that machine. For us to be really effective, we are going in the plants and factories and working right there with them.

In a majority of our cases we are hiring someone called an on-site coordinator, that is a state employee employed by the state of Ohio given to the industry for the duration of the training effort. We have also hired people called unit teachers. At a factory in eastern Ohio with 75 employees, we placed two full-time teachers, put them in the building for a year period. Those two teachers are there to teach a variety of things. We feel that this is cost effective for $36,000 for the whole two years. There is a lot of training taking place and it's not a company employee, it's a state employee and it's working very, very well.

So we've looked up and down the spectrum. We have gone many, many directions of how we are delivering these training services and we are finding out we have to be very, very flexible. The big thing that we done in our state is that the business community is starting to have a respect for the educational community again, believing that we can deliver training services. Just to give an example, at Ford Motor Company we were working with eight major Ford plants in the state of Ohio. The reason I was up there was because they were showing me a new machine they are installing. You would be pleased that one of the major developers of that machine is Alan Bradley out of Milwaukee. It's an optical indexing machine with a laser welding system for their transmissions. The machine costs $560,000 but the company has no idea how it runs, the schools have no idea how it runs. What we are trying to do is to get the schools and the company to sit down with their sleeves rolled up to plan how to teach these skills. Allen Bradley is helping them, too, because there are several computer servos. That's really a complex piece of equipment but we are not letting the company do it on their own, we as educators are helping them.

We have had three research studies on our program already. We came out very, very well on all three of them. Lynn Bryant of the National Center of Vocational Education found two things as a result of the education system involving themselves internally in training in a plant. Number one, the quality of the training was much better and in almost every case, the company experienced a productivity increase just because of the training. The other issue was as I mentioned better quality, but the best thing that happened that the industry realized that after our training input that they no longer could function without an ongoing training effort. Every company that we worked with so far have continued the training after we backed off and that's significant. We feel that that is extremely significant because in this day and age obviously unless you have an on-going training program you are going to slip out of the technological know-how very quickly.

A couple of other things I would share with you here is an article that was in Ambassador Magazine probably a year and a half ago it's called, "War Between the States," and it's simply a look at how states are competing with each other to steal each others business. I always like to see that little thing from Alabama. I don't know if you have ever seen it showing a guy running a drill press and it says, Alabama has skilled workers. Now I have a disagreement with that becasue I have been to Alabama and Alabama does not have the history of manufacturing as we do in our two states, Ohio and Wisconsin. Maybe our wages are higher here than they are in the south, but we are giving you, I think a few more plusses for those bucks. We're feeling very strong, we're getting a lot of companies willing to say that indeed the industrial midwest does have the best skilled work force in the country. When you go to areas where the traditional occupation was agriculture you find that the industrial midwest has something to sell.

There is a federal research study put out by the subcommittee on monitoring fiscal policy, the Joint Economic Committee of Congress, focusing on high-tech firms and why they would locate. I am very pleased to read one statement to you: that 33.9 percent of all emerging new high-tech firms will locate in the industrial midwest. In other words, we are going to get the greater share of them, that's the summary of this research study.

Another issue here I found extremely interesting was a grid of factors that influence regional location choice of high-tech companies. The number one factor for a high-tech firm locating in a particular state is labor skills and the availability of labor skills. Number two is labor cost, 3) is tax climate, 4) academic institutions that provide high-tech information, 5) cost of living, 6) transportation, 7) access to markets, 8) regional or regulatory practices, 9) energy costs, 10) cultural amenities, 11) climate, which excites me because Florida no longer has the heavy attraction, and 12) access to raw materials.

I was part of a national subcommittee meeting where six congressional people were hearing people in the Columbus, Ohio area because that has tended to be a high-tech area. George Foster is one of the respondents to that committee and they are saying, "George Foster, why did you locate your company here?"

George Foster helped found "Accuray", Industrial Nuclionics, an extremely high-tech firm, very successufl. Around 12-14 years ago, George Foster said that they located in Columbus, Ohio for a variety of reasons. The university is here and the Battelle Memorial Institute is here. He says the real reason he located here was because they needed a license to use atomic materials. We went to the town and asked where can we get a license to use atomic materials? Well Battelle called somebody at the bureaucratic level who had the authority to give such a license and the person on the other end of the line was hedging. George Foster was standing there talking to this person from Battelle. The person from Battelle says, "I don't care how you have to do it, this means that we are going to get a brand new company in Columbus, Ohio, you get that license," and the person came through and Accuray ended up locating in Columbus, Ohio. George Foster said that even though the industrial technology was there, one person had the tenacity to assure him that they were wanted. I think that was an important issue. Even though we have all of the other factors, there must be an aggressive activity in terms of economic development.

Any questions at this point? I want to be sure that you ask questions. "What percentage of the training that you do comes from outside the voc-tech area, do you have the high schools and the colleges and everybody else involved?" Right. That is a serious issue, and the issue is something called vendor training. Many times like Allen Bradley, we do not have an instructor that is going to teach that new "laser optical locating and centering" piece of equipment. We pay for Allen Bradley to come in and do that training for us. We still consider it a voc-tech event because we locate the resource to do that training. If we have a technology that no one else has, we'll take one of our own instructors and ship them to Europe or Japan, to learn a new technology for however long it takes; they come back and teach that technology. We spend quite a lot of money on that.

An Ohio industry asked one of our schools for a certain kind of training in the schools. Well, we no longer offer that in our state, but we don't say we don't offer it. We will say we may not have it, we are going to find it within two days for you, and that is what we do. We gear up to serve that need. In other words, we will find that resource some place, even though it is private vendor. Once we have and find that private vendor then it is up to us to upgrade our technologies in our schools to meet that need.

Incidentally, I have written a futurist paper and I am going to give you a copy and if you would like to duplicate it for other folks that is fine, but that is one of the issues that I felt was very necessary. I just want to share another quick thing with you on the types of training we do. I'm not sure if you know what Ford Motor Company is about but they are doing something called Quality One. Most people do not understand what Quality One means. Quality One means that Ford by 1986 demands that their parts and their cars will be totally interchangeable. Now, as I mentioned I have a background in manufacturing. It used to be that if you produced a rod bearing for Ford, Ford would mic it and they would grade it. It's called part grading; they would mic that depending whether it is over or under the tolerance. They would mic it if it was over the mean grade of one, two, three, four or five. Japanese technology and Japanese academics use a Demming plan, that's what Statistical Quality Analysis is all about. Ford Motor Company has insisted

that all of its vendors in this country come up to snuff by 1985 because incoming parts to Ford Motor Compnay as well as GM and Chrysler will no longer be checked. When you send a part, you are telling them without question that it's on the money.

Ford Motor Company also insists that all of their vendors show within six months that they have a program to train their employees on SQA, Statistical Quality Analysis. One of our companies in Ohio, which manufactures 65 percent of Ford's rod bearings, called the schools. They called their consortia director, Ron Bordman, in the Mid Central area. These people are excited because if they don't have this training program within six months they are out of the parade. Ford would no longer use their product. We sat down with them and designed the entire Statistical Quality Program. The problem was not teaching SQA, Statistical Quality Analysis; the problem was that under the new system, the person who runs the part is going to check it. No longer is a part checker going to come around and check it; the person who manufacturers the part checks it. Remember, all of these people in industry, have less than a college education. All of a sudden you are going to put up a sign on the board and we're going to teach you Statistical Quality Analysis. We realize we're going to have a design a program to teach 550 employees the difference between a micing process and a process control method, showing the process control methods right on the money. If you really have no idea about what I am talking about, usually a part manufactured will be plus or minus one thousandth. If it were almost to one thousandth, that's o.k. now they are going to something called $\overline{X}R$ which simply means they are reducing the tolerance limits. They are closing the minimal bid, reducing the limits. Ford's ultimate is something called $\overline{X}$ sigma, meaning severe. Ultimately by 1985 all of the parts have to shake out right across the line; in other words that's when you get to total interchangeability. We were concerned because these people who manufacture the part used to just put the part in and stamp it; now they have to be responsible for its quality control. These people have to be taught charting; charting is a statistical process and we successfully taught them.

We went to Ford on behalf of this company and with our entire program. Ford was very impressed with it and here's what they said. Ford said, "Are you telling me that schools did this" and I said, "Yes, we did, and we are very proud that we did it." Now Ford wanted us to use it all over the country. We said you can use it in any Ford plant in Ohio because the state of Ohio paid for it but anywhere else we would appreciate the next state picking it up over there. It went over very big, but the astounding thing I found, of all the 2,200 vendors how many do you think had a Statistical Quality Control training program in place? Six. At that time there were six, we were number seven. I was horrified; no wonder we are in this trouble in America, everybody is kind of out doing their own thing. There are a lot of things happening in manufacturing that we in the schools have to be aware of and this SQA, Statistical Quality Analysis is just but one of them. I am very pleased that we invested a minimal amount of money, probably about $150,000, in this whole program to train 550 people to save an Ohio industry. I can promise you that industry was horrified, they didn't know what to do, even though they call themselves trainers. When we finally came there as educators they felt very good, they felt very comfortable and they were very pleased with our product. So I am saying that we have a definite impact for the business community, we are starting to gain a good reputation.

Question: "What did you say that it cost you to run this project?" About $150,000 because there was a lot of audio visuals. We went to a private vendor and the cost of the vendor just to develop the audio visual package would have been $30,000; we did it for $5,000. This was paying for all of the instruction, for all of the instructional hours. We do not pay wages while training is going on, just the instructors salary, and any audio visuals. I have a little booklet here that describes exactly what we do, I'll leave that. We try to be very brief in describing initially what we do, because you have no idea how industry will pin you down--"you said you would do that, I want it." So we try to be very vague in what we promise because ultimately we want to have a final say in what we really pay for because we have to be sure. There are four categories to receive funding in our program, (1) new industry, (2) expanding industry, (3) industry that's adding capital dollars to new investment of higher productivity equipment, (in other words if they are putting in robotics, something to increase production, we would help pay for the training) (4) retention, where an industry is in serious difficulty, going out of business. We really weigh that one very heavily before we start investing money, we have to be assured that training is going to be used to save that company.

Question: "Who is the Czar that determines where you are going to put your money? You obviously have to have a quick turn around time on the decisions too." Turn around time has been a severe problem because it gets in the state bureaucracy and you want to know who the Czar is, I am. I judge all of these proposals, that's a horrifying thing to have to do, but up to now we have had no other system. Now I have finally formed a committee between the Department of Development and myself. We meet every Monday morning and scrutinize proposals, we get a lot of proposals in now, and the word is out, we get proposals, proposals, proposals so I now have a committee that sits in scrutiny of them. I just briefly want to describe what happens to that process after we agree on a proposal; how much money, what kind of training is going to take place, that proposal then goes through paperwork before it becomes a contract. The contract is between the Department of Education, the Department of Development, and a local school system. It could be a university or a vocational-technical school who will be the fiscal agent. Now the problem we have, we do not allow any local school any funds for administering these dollars and that has been a serious, volatile issue in our state. One school board member said we are subsidizing industry and why is the local school board involved. I'm pointing out with a minimal investment you are going to save that firm, that firm saved produces tax dollars for that school district to survive. This particular board member wanted the money that we gave to industry to be given to the schools. An editorial writer came to my defense and almost word for word said that the state of Ohio is investing training dollars and industry to save them because they will be a permanent tax base for the school district. It's the best way. That has been a volatile issue because some of the local schools want money and I'm trying to convince them that it's a healthy thing, and it is a healthy thing. Just by being the fiscal agent, delivering the checks and the money for this training puts them in a communication system with a business they never worked with before, it makes them look good; they like to have their picture taken, giving them their check for their training and it's working out very, very well.

Question: "Do you ever have the opposite of two educational arms within one of your districts fighting over who is going to do the training?" Oh, absolutely. That is another volatile issue we have, in some cases it is and in some cases it isn't, depending where it's located. "Does your local level guy try to resolve that ahead of time?" It's really the job of the consortium director and the committee which meets once a month. Incidentally, on the committee if the chief executive officer of the school doesn't show up; they have no vote. They can't proxie the vote. We have had a lot of flack over that too, but we are trying to say that this is so important it demands the attention of the president of the college, the community college and so on and that has been a sore issue also.

Question: "Will that issue of who does the training go to a vote?" Yes, they vote internally. Really, it should be which school would do the best, give the best service, and so on. So far I have not had to go in and referee. They finally have arrived at a decision locally but a lot of school districts are saying that it is a lot of work, writing those checks and keeping the fiscal records that they have to keep, plus the local school becomes fiscally responsible for all of that money for the audit trail. So we review this at our state and these are mistakes that you don't need to make. We reviewed, is that the right way to do it; we decided that is the best way to do it, to deliver the money through a local school district. We looked at other ways, writing direct contracts with the industry and the Department of Development; we looked at many, many ways. We finally decided delivering it through a school district is really the best way to do it. So when you go over that ground you may not have to make that decision. We already have found out that that is the best way to do it.

I didn't finish the article the "War Between the States". This article is pretty interesting because they are talking about the amount of money their departments invest in trying to attract industries from other states. They are saying for the most part that it probably all shakes out even; you get a couple, we get a couple and all of the money we invest in the company is benefited. They said probably the best tool--and I have this highlighted in red somewhere--is probably the money that you channel for training programs. That's turning out to be a powerful sales tool; that when an industry is coming to your state, sure you have economic development issues but what do you have for training. They were finding out that money--this was the state of Maryland--they are saying that the million and a half dollars they have budgeted for training is probably the best sales tool they had in attracting industry. This is like your Department of Development, we have economic development centers. That's probably the thing that I would suggest that you do for education agencies. We have a rather thick book that highlights all of the incentive programs in our state. I found out that the local superintendent of schools, local community colleges had no idea how development operates in our state. We are putting on specialized training programs so they will know what kind of incentives are offered to industries when they locate or expand in the state of Ohio. We are running special workshops for them; we are running special workshops for local vocational directors, running special workshops for all of our adult supervisors in the state so they will not be economic development specialists but will be able to communicate intelligently about how economic development occurs. One of our training programs listed in here is a course called our job training program. The program I am describing until a year and a half ago to two years ago was not listed as an incentive but it is now and it's a right-up-front incentive. I guess that all I am saying is that our training program in our schools, universities and vocational-technical schools are now visible as a highly visible part of the economic development plum that we try to create for our state.

Somebody asked me why I came. In fact, I was at the OEDC meeting last week and I told them that I was coming to Wisconsin to meet you folks, and these were private sector people, and they said, why are you going? First of all I am an Ohioan, second of all I am an American and third, I am a vocational educator. I feel very strongly that vocational-technical education should be right at the delivery system of what we are trying to do in economic development. We need to be closer; it is a national movement so I have no problem being here today. I am not going to share anything with you that is going to put you in greater competition with us and he accepted that. He felt that that made sense.

Question: "How long have you been in the business?" The job I have now? "Yes." I started in the mid 1979 and just spent six months trying to figure out what to do. It was really a tough, tough task. I didn't share something with you, my first task was to become visible in the Department of Development. In the three years that I have been over there I am just like a staff person; I spend more time over there than I do in my own office. They know me very, very well; I travel in the same circles; I'm the only educator ever to do so; and I feel that has been a major reason for the success of our program. Everybody in the Department of Development knows me and know me very well. Anytime an industry person who works in economic development has a question about education, they have instant access to somebody to give them an answer. We have a lot of volatile things happening in our program that demand instant answers.

Question: "Can you talk some more about people getting together who are from different organizations and those organizations are competitive in some respects but benefit greatly by cooperation in other respects, you have had a lot of experience in this." To give you an example, let's just take the Toledo consortium, it's a consortium of the vocational and technical resources; we now just call it OITP, Ohio's Industrial Training Program. That's all we call it, we no longer call it the consortium. Typically all of them have local constitutions. We are talking about organizing them under a "530" corporate structure. We haven't decided to do that yet; we are still maintaining their local independent autonomy. The executive committee is made up of nine people; six of them are educators and three from the business community. It's a two-thirds split, the reason being because the educational community cannot give away its right. If it were the other way then they would give away their right to choose educational direction, so the vote is six school and three from the business community. They vote on all of the proposals, they decide who is going to get it, who is going to do what and so on. Then you have the overall consortia committee that is made up of anybody, any person who would want to belong. We have all of the agencies and organizations that want to be part of this. This group meets probably once every three months. The executive committee group has to meet monthly and sometimes more frequently that that when there is an issue to be decided. They may decide on the phone but this is the decision base. Believe it or not it took a long time to arrive at this structure because we had so many structures going on in the state that it was unbelievable. We had allowed them to kind of go in their own direction. This is how we ended up. We think that's probably the way we are going to end up. One problem we have is that when they vote they really have no authority to vote. These people hired the local consortium director,

we gave them the money and they hired the person, but we found out that legally they had no authority over this person because their consortium director was hired by one of the school districts who acts as a fiscal agent. So legally, the school is really that person's employer. We found out that the consortium director is a leader in each one of these communities, each one of these districts. Their authority was really advisory. The only authority was the school or tech school or vocational center who actually employed them, so we are wrestling with that issue.

Question: "Did these people then, say the nine or larger group, really level with each other and share with each other the kinds of things that they thought might help their individual group better and at the same time recognize that if they could all do it better they would be much more attractive in total?" Yes, as a matter of fact, I'll tell you how well it has worked. Cleveland is traditionally a volatile area. Our person is housed in the Cleveland Growth Association which, is their chamber. They have asked permission from us to give the Cleveland Chamber the authority of managing our consortia director in the Cleveland area. We have done that because they have placed our person, who is an educator, in charge of all job training programs including CETA, JTPA and everything within the Cleveland area. We feel that is very, very good because finally education is at the helm of anything that is going to happen educationally.

We do management training or any kind of training necessary. We have no target population which makes us distinctly different. Also, we do very little, if any pre-job training. All of our training is occuring after the employee has been hired. It solves a lot of problems for us so if CETA and JTPA want to be involved in selecting people and training private employees, that's fine. After employment, we will pick up all of that training effort. I don't know of any training we have so far that has been pre-employment; its always been after they have been employed. That's a very important point. We should be compatible with JTPA and CETA.

Governor's grant CETA dollars are used to employ these 23 people. The Governor felt very strong about this program because they felt that for the first time using CETA dollars they were able to attract state dollars to create employment. That's exactly right, of all the programs CETA put together, our program is the only one that actually attracted the state legislature to fund money to pay for training programs. Our cost per trainee so far in our program? ("For ninety days or less?") is $241 and we are very proud of it. We were at one time at $100 and it has gone up a little bit but we are very proud. No one could argue with those statistics, we have trained 73,000 Ohio workers in our training program so far and that's $241 per trainee.

Question: "Are these 23 people primarily educators?" No, we have them all up and down the spectrum; in other words, we allow the local committee to select who they feel would do the best job. In some cases we have former business people. The business person has the capacity to get in and see business people. We found the educators had a little difficulty initially, but fellows like Tom Shearer who carry a Toledo business card of the Toledo Chamber of Commerce have no problem whatsoever even though he is an educator. Same way with Dave Makida in Cleveland, he carried a Chamber of Commerce business card, everybody thinks he's a Chamber person and he has a Chamber

office, a Chamber phone number, a Chamber title, so we have no problem with that. We initially were fearful that the business community was taking our authority and we realized later on that is probably the best thing that could happen because we clearly are in charge of that person, we pay his salary and he is loyal to us. We meet once a month so we keep our act together. Our whole objective has been to penetrate the business community, to penetrate to deliver these business confidentials. In fact, our 23 people have, and have access to business confidentials in our state. It's the first group of educators ever to have that access. Many times they can't even share the business confidentials of those nine people in our committee. Our people who have access to business confidentials went through a four-hour training program. I am sure you are aware in the development business if anyone "tips" a confidential, you can not only ruin that company but you ruin your credibility in keeping confidentials for other companies. It's a very serious business and the educator is not aware of that. They're not aware of that. We in education are great for making things public.

Question: "Does that ever get to a situation where one community and another are both working to attract the same industry? Does your program become a neutral, or do you ever find one vying with the other over your turf?" That has happened in a couple of cases but our persons have stayed out of it. We will tell them whoever ends up getting the company we'll still work with them but obviously these people are still assuming we're serving the same board in many cases. So that is an issue.

Question: "How much of this is outside of manufacturing?" O.K., that's a good question, we only deal with manufacturing. That is another serious, unfortunate issue; only in manufacturing. The reason being because the Department of Development set that rule; the Department of Development deals in IRBs, industrial revenue bonds and so on and they feel that if you are eligible for an IRB you are eligible for state assistance. If you're not you probably aren't. I am having a lot of problems with my vocational education friends in agriculture; home economics people are really upset. We do use some distributive education and business and office education, but the majority of them are trade and industrial education. I'm glad you asked that question, it is a serious issue.

Question: "Do you say it's serious; you wouldn't want to dilute it further, or which way do you mean?" Well, it's serious because the education community is upset by it. For instance, Higby's in Cleveland just added 200 workers and we cannot use our training program to train them.

Question: "Don't you think you would open the flood gates if you opened training for non-manufacturing?" Well that's another problem and we are very tight on our four criteria. We put together a proposal that the industry has to fill out to receive our funds. "If we are moving into a post-industrial society then we're looking at the shrinking-end of manufacturing." I tend to agree with it because manufacturing has limited resources. Our legislature is like most others. We're in tough straits but they are still giving us that $12 million over the biennium to do this. It wouldn't take very long, you know (I am only dealing with 138 companies), for that to grow into 400 or 500 companies and then we are going to be broke, so that is an issue.

I have an interesting article here why business and education can't get together that I thought I would share. I think that these comments are very accurate. The first one is lack of understanding by educational institutions of the purpose and role of private industry and vice versa; the private industry doesn't understand us, the educational community does not understand business. Educational institutions are not meeting industries real world needs. I am sorry that I don't have a list of all of the things that we do for industry but I can tell you that list is extensive and it is foreign. There are things that they are teaching as industrialists that I had never heard of before, such as laser technology. I have a list from a new firm we are putting in Cleveland, a high-tech firm. The things we are doing for them are simply not in our dictionary. I'm sure no school in the State of Ohio offers a comparable training program. Education's responsibility is to the taxpayer and the industry's responsibility is to their stockholders, so we have a divergent flow there. Greater use of industry personnel would be appropriate in cooperative education. The idea here is they believe that trainers mistrust people in the academic community. What I found out in our state, however, is that they didn't mistrust them because as soon as we, as educators, went to the business community and said we want to help, we found out that they wanted it. The problem was not mistrust, there was just no communication going on at all. The communication was at different levels than we thought it should be; now that we are available to the business community they are finding it a very positive thing.

Question: "When did the funds start?" The reason I was hired was because the legislature was about ready to provide $10 million to this new job training effort, the education side of it so I was employed to put this in place. We ran into a legislative snag; it took over a year and a half for me to get the $10 million. Whenever I found a training need, the Department of Development found the money somewhere; we just had to stumble to find money. We finally got our budget a year ago last fall.

Question: "Our Department of Development is currently proposing $1.35 million per biennium for quick-start training. Did you run into any resistance when you were after $10 million, were there any legislators saying, 'gee, business administrators should be paying for that, not the state?'" Not at all, not one dissenting vote. As a matter of fact, our Department of Development director, who just left because of political take over, made the statement that when this program gets rolling it's going to take $25 million a year to operate funding. The legislature voted it in without any dissenting vote. There was no question in the legislature's mind. We needed to change some language of the bill; we had a lot of trouble getting that change but the legislature is clearly behind this effort, there is no problem there.

Question: "Is there any cost-share provision?" How do you mean cost-share? "Do they participate in funding?" Oh my gosh, yes. As a matter of fact, if you take a look at a training program (and we do this deliberately) we show the total cost of training effort, whatever it may be, our investment, the Department of Development's investment, and the company's investment. We usually pick up about one-third, the company is picking up two-thirds. When we are talking about the cost, the industry always includes the cost of the wages while that person is being trained. That is a tough one. We dealt with that one, and I don't want to bore you with how we figured out how to do that. We have a rule; if a training effort is going out but you are

producing a part for Commerce, that is not a training effort and we can't be involved. We can, if the person doing the teaching is an employee of the company. In other words, we can hire a teacher and place them in industry and that teacher is not subsidizing industry.

Question: "You are talking about basically up to $11.00 an hour and some audiovisuals?" Exactly. "That's why you have a $240 per trainee average?" No, there are other things we pay for, a lot of other things. We pay for travel for people who go out of state, out of country to learn. I'll leave this booklet. At one company we put in probably $50,000 worth of classroom furniture that we retained. We pay for audiovisual production; we pay for the actual production of the audiovisual teaching aids. We go out on location with cameras; we paid $140,000 to Ohio State University under special contract so any time we need a university specialist we can pull them right out of the university and put them on the line.

Question: "Are you charging that then to a given training program?" Yes, that's exactly right. We do a lot of things with that money and the $11.00 an hour is just kind of the foundation. This describes the other things we do and I will leave that so you can have it as a guideline. We do a lot of things that industry never thought about doing.

Question: "Does industry participate in any of the non-wage costs?" Yes they do. "What kinds?" Well, for instance, if you were a group of tool and die makers, and I was an engineer and I am teaching you something called CNC, it's not my job to teach you CNC so we pay up to $11.00 an hour of that engineer's salary. The company picks up the rest and the engineer's fringe benefit probably around 19 or 20 percent, so the industry is picking up the rest. Almost anything we involve ourselves in, the industry is picking up probably over half of the share, just about. "Non-wage?" Non-wage share. "About half of the non-wage?" Yes.

Something else that may be interesting, we have worked with firms with as many as two people to train up to 6,000 employees. It shows that we are working up and down the spectrum so it has worked very well. "And all of these trainees have been hired." Exactly. We do have the capacity to train prior to employment, but we've never done it for a variety of reasons. We have elected to ask the employer to hire them. We do have a system, however where we can pre-train them, but you cannot force them on an employer. The employer must then go through their normal screening process and select from the training graduate group who they want.

Question: "Would you talk about credits and CEUs?" If a trainee receives CEU or any kind of credit, we don't pay the bill, it's that simple. "Even a CEU?" Well, a CEU I would probably choke a little bit on that, but if they are going after a degree, they are using that learning toward a degree. If we know it, we will shut off our training program for that person. "Do you get negative feedback from the institutions?" No. They are getting much in real dollars out of this training effort, that is a serious issue and I really haven't figured out how to deal with it yet. One thing we do is give them training money up front. If the grant is $180,000, we generally give them 10 percent up to 40 percent right up front so they can pay bills. The contract says the interest earned on that money is the property of the State of Ohio. We are thinking about giving them the interest, that's something.

Now something else you may be interested in is what we did with the money. The money was appropriated into post-secondary vocational education, then the money was transferred from our department to the Department of Development. There are two shares. We still are using federal money (the vocational education side is federal money) the DOD side is nothing more than our educational money transplanted to them. Now I don't want to go into the reason that happened. It's kind of an internal political thing that happened. The community colleges wanted it over there and they got it over through the legislature.

Question: "Are you picking up any information on value through the training systems, are you flowing it back?" Absolutely. Well, the flow is there because the local training institutions are doing it but I'll give you an example; we just did a massive curriculum on robotics and robotics training. It was very thick, we duplicated that entire thing and sent it all over the State of Ohio. Similar materials will be disseminated, so without question it's a two-way street. We're picking up so much information it's unblievable. "I would think that would be a major selling device for your activity." But you see schools are oriented towards money. Unfortunately, they want to see that money come through the door. I can get somebody in the lower echelon to talk about values to students; but the superintendent is still interested in money.

Question: "Would you go through that organization chart again, please?" The Ohio Economic Development Committee is a private sector committee. In our state, by legislation, the Ohio Economic Development Committee is made up of private sector economic development specialists; people in utilities, Chambers of Commerce, banks. This is the actual economic development, this is an arm of the Department of Development. This group, in our state, is a first line recipient of business confidentials, as opposed to the Department of Development. If the Department of Development should receive one, it immediately goes back to the OEDC. "That's not a state board of the Department of Development?" No, it's advisory only. These people go out on industrial jaunts and I meet with them every month and they report where they have been and every month they go over the list of business confidentials.

"So then who oversees what you are doing?" I'm kind of a liaison between the two. I am a liaison person paid by education but I work with the Department of Development. The Department of Development has also hired two people over here to work with me; they are my colleagues, and the three of us kind of run the state program together. That just happened about a year ago prior to that I was trying to do that alone.

Question: "How many of the 137 plants are unionized?" Probably a majority of them. We've had no problems with unions. Now I'll be right up front with you, the only problem we have had was when a company called ARMCO Steel shut down. They laid off everybody; they went out of business. New owners came along as a venture capital system and bought that steel company and opened it again but did not hire U.S. steel workers back. So this company, newly formed with all new employees, asked the State of Ohio for assistance. We could not refuse them. It was a brand new company, whole new management system. The steel workers were upset and I agree with them that they were upset. But there was no way that we could legally say, no, we can't help you. I hope we have that resolved but it placed us in a very difficult position. We had no way to get out of that one even though we might have, under those circumstances wanted to stay away from it, we couldn't.

Question: "The funds for the administrator come from an appropriate education department, are transferred to the DOD and the DOD brings it to you?" The dollars from the legislature come in to our coffers, the $10 million a year. Then we transfer it over to DOD so the money that came to education is now in the Department of Development. We, however have a separate source of funds called federal funds so when we finally put together a training program we get money from two sources. It's complex because the question is why don't we just leave it over here and just run it through all one direction. That is the way it happened. Politically, we ended up with the money in DOD and that's probably where it is going to stay.

Question: "You said that the funds are administered through local consortia, you don't have VTAE Districts?" The 23 consortia are randomly put together according to local economic development actitities. "So these dis icts are totally for this purpose." Exactly, that's all they do. "They are not a legal entity?" No, they are not a legal entity, that's one of the things I was saying, we have a problem, they are not a legal entity. I am talking about administering the funds. The industry ultimately receives the funds, we can deliver them from the state level. We elect to run the money through the local school district to the industry, that's a cleaner way to do it. Not that consortia but an actual existing school district. "What participation does the local school district have in the program?" They are the fiscal agent. They handle all of the accounting; they handle the audit trail and everything else. The schools want a 10 percent override. That is a building issue in our state. Schools want to be paid to act as fiscal agent.

I would make a strong recommendation: If I would have all of this to do over again, I would let every person who sits in command of a local educational institution know what you are doing. I did a good job with the superintendents but I failed to go to the high school principals. I went to the vocational-technical people, I forgot to go to their counter parts. The other big group I left out was the school board members. I had no idea that school board members got involved. I am making a special presentation to the state's school board meeting. I'm going to be the major part of the program; I'm writing a special article for them. For some reason I really never thought they would want to be involved, but see they are sitting there voting on these contracts. "Well you have got a different setup here, you are dealing with school superintendents, secondary, post secondary, community colleges, and universities. We have a separate public post-secondary vocational-technical system."

Question: "Is it conceivable that we could structure a system to just deal with the voc-tech system, and funnel the monies back through those vehicles; and if we wanted to, contract out to a high school district?" You would get some flack though. Our Board of Regents came down hard on us over that because the universities want a piece of the action. When we started running it through the vocational-technical schools the universities objected.

Question: "You might have told us but I missed it, how are the people on the OEDC selected?" They are granted membership by action of the membership of OEDC. All of the utilities have the right to request membership, all of the economic development Chambers of Commerce have the right, and the institutions that handle industrial finances. "How big of a group is that?" I would say it's about 35 members, I'm just guessing because I meet with them every month. "Are they compensated?" No, their company pays their wages; they want them there. The OEDC has been an educational resource for me. I

have learned so much in three years about economic development and for you folks in this room who are educators, it's an exciting business.

I just want to be sure to mention a caution, when I first started doing those proposals; when I started working with economic development people, I really was generous. I found out that I probably did not need to do that, that I could have been a little more conservative than I was. It's a new horizon for education I think; it's not only happening in our two states but I think it's going to happen in all of the country that education, especially vocational-technical and universities are becoming involved in this effort. It gives economic development in each state a little more emphasis, a higher impact.

I'm really employed by the Ohio State University but I work at vocational-technical offices in Ohio. "You are an employee of the State Department of Education, paid for by Ohio State, working in the Department of Development." Exactly. Also remember 13 Consortium Directors work locally in economic development institutions, Chambers of Commerce, and we pay their salary. I think it's healthy

Question: "What kind of response did you get from the existing leaders of the vocational-technical centers?" They are cooperating but they still want to call all of the local shots. They don't want me to tell them how much they have to spend on local industry. "The reason I asked that question is because I find the same thing is happening in our local district." What the local district would like, they would like their ability to decide how much money is going to that industry and just send them a blank check and we are not going to offer it like that. We believe the state level working with economic development specialists should make that determination. The reason being, when I am doing a proposal, I am generous in that proposal to the extent of the economic impact of that particular industry. If there are 400 new people to train I am going to be very conservative. We are trying to keep this committee at the state level providing in judgment for these proposals.

Question: "How much of the same kind of training, short-term intensive training occurs outside of your own jurisdiction in the various districts?" A lot, that's an excellent question. "You didn't usurp that, you're not doing all of that?" No, in other words, many times when I do a proposal I will check the local adult education. In other words, if this is something you are asking for that is already offered, you already have a resource for that and there is no reason for our program to pay. Many times you will get a proposal referring back to local adult education like sales training and management training. We already do that. All I want to pay for is something that local schools can't do so we do have other training resources beyond our training program.

Question: "What were those four categories again?" New industry, expanding industry (expanding to us means creating new jobs), capital investment (higher productivity equipment, CNC, things that are going to make your company more productive) and retention (where we can be assured that training will save that company). "Are those listed in priority as far as these projects are concerned. Would a new industry project submitted by given the top priority?" New industry is what we call a "hit," that's going through, there is no

hesitation. We will be generous. If it were retention, however, and I clearly saw that implementing quality circles will save this company, I will be generous too. Another important point, anytime we assist in a training project we have a letter from the corporate president. The chief executive office must write the letter, it cannot be somebody under that person. Unless we have that commitment we don't even consider the proposal. We found that's very important.

Question: "Do you have the situation of getting heat from special interests that want to influence this decision, i.e., the legislature, local officials, others that have either committed themselves or are very close to an issue?" I'll give you an actual issue on the political situation. We had a company that was going to expand 400 jobs. We sent the contracts out. The training began except they didn't hire the 400 people because of business problems. In fact they never did, so when the contract ran out they only did a very small portion of their training effort. The contract has beginning and ending dates so when the contract terminated they said they wanted to keep on going and we said no, you didn't hire the 400 people. We said, this money is still there and we will hold it in the bank. When you hire the 400 people we'll come back and help you. Well, the company complained to their local politician, the politician got the county chairman involved, they got the Governor involved. We still haven't paid it and I have visited them and pointed out that the money is still there. When the trigger of 400 people emerges we'll be there with that money. That's a burning issue and the politicians are involved. There is no doubt they are trying to press us to make that decision. Once you do, the gate is open and once you open the gates there is no criteria.

Question: "Can you leave us your resume?" I need to tell you that no prophet is a hero in his own country. This project has attracted so much attention, so quickly, that everybody wanted my job, everybody wanted my title, everybody wanted that notoriety.

"For Wisconsin: Megatrends or Minivisions?"
Jim Johnson
3M: Director Physical Science Research Lab and Executive Scientist (retired)
Presentation at COMMISSION '85, March 24, 1983

I'm not the futurist you were promised. Liz told you this morning that Earl Joseph will be here in June. My career has been making the future rather than writing or talking about it and that's not usually so exciting, but I hope that some of the things we talk about this morning will challenge you to a lively discussion. I have been privileged to work in frontier fields, such as early nuclear technology at Oak Ridge National Lab and advanced technology at 3M Company. I worked on a nuclear airplane and a couple of nuclear rockets and helped develop materials for them; then on auto admission controls systems, the scanner laser, and many of the emerging technologies that underlie the new products of the 1980's.

I bring those up, however, because most everything I've done is a failure. They were too far ahead of their time, or they were too late, or they didn't work the way we thought they were going to. (I'm very happy that the nuclear airplane didn't work.) But, then again, there have been a few successes, I'm not going to dwell on those because I'll miss my point - which is that very often we fail. In fact, in the kind of research I did, failure occurred 99 times out of 100. So you are looking at someone who was pretty used to failing. That's the way it is when you are on the frontier doing it instead of talking about it.

So I want to begin our discussion this way because I feel that you who are working on the future of the state and the future of the VTAE System, as it's going to affect and benefit the state, should expect failures along with your successes. We should expect, in fact, a lot of failures and if we don't have that in mind in the beginning I think that some of us may tend to give up, and we shouldn't do that. Some of us who are now retired from industry count it a privilege to be working with you in this effort. It's an adventure.

Each of us has a different perspective of the problems that we face and I'm sure that we have some very different ideas about what to do about them. But the key is that we want to try, and get on with it. I belive it is fundamental that our educational system must play a major role in the confrontation we face in a rapidly changing world.

I'm sure some of you read Alvin Toffler's book many years ago called Future Shock. He writes of people (and we have a lot of those people around us today) who say, "Stop the world, I want to get off." That's an expression of our inability to cope with the very rapidly changing scene. "Why can't we cope?" Well, it's usually because we don't know what to do. We don't have the training, number one, or the knowledge, and sometimes even the motivation. Or we are just plain scared. But we have to hope. There is no place to get off of the world! Even the traditional response may be a trap: In the old days, a century and a half ago, it was "go west, young man." Today it may be "move to the Sunbelt," or wherever there may be jobs, but the jobs in the Sunbelt have no less need for the new skills, knowledge, and education than those that we can create right here. The responsibility then, of the education system comes clear.

It would be better if the specific responses needed were equally clear. That is our challenge. As Orv said in my introduction, in the past several years I have been working at building bridges between universities and industries because I believe that their cooperation is vital. The schools he listed, as you know, are mostly universities (you could also add Carleton and St. Olaf where I have had interaction recently). I'm not so familiar with the VTAE System. So I may be speaking "French" today in terms of university problems and you are going to have to listen in your "German" (VTAE) and translate, but I think that some of the comments may be appropriate.

I would like to share with you some thoughts that have come from this experience. The words that come to my mind include attitude, access, connections, mechanisms, service, implementation, feedback, and accomplishment. Unfortunately, some other words come to mind: ivory tower, (I call the equivalent in industry the granite tower), bureaucracy, misunderstandings. Before we address some of these words I would like to set the scene as I see it. Perhaps some of you will disagree with the way I see the emerging world. The literature from other sources that Liz has kindly presented to you does in fact include a lot of disagreement. But it's important that we lay out the problem at least as I am going to discuss it, and perhaps then we can bring in your thoughts, that may in fact, disagree.

James Cook in Forbes magazine in November last year, wrote an article called, "The Molting of America". Some of you may have read it. He stated that the United States and indeed the entire industrial world is profoundly changing the way it uses men, materials and resources, capital and manufacturing processes. Now profound changes are upsetting. The Austrian economist, Schumpeter, spoke of such changes in the metaphor of a gale blowing out the inefficient and the obsolete and these winds, Cook says, have made a wasteland of the Midwest--that's us. I thought of that as I flew into Milwaukee a couple of weeks ago. I looked down at some of the buildings; they were crumbling, windows broken out. I thought these once housed busy men and women making products of another time. But those same winds can blow in as well as blow out. They can blow in the wave of new industries; however, if we read the very excellent study by Kay Plantes on the status of Wisconsin manufacturing, I think that we should be concerned about the facts that show that perhaps the blowing out is going on faster than the blowing in.

The message we read over and over again is a very popular message today, that the future lies in the world of high technology. Indeed a substantial amount does. The industrial world is rapidly losing its old manufacturing jobs to the developing world nations. Some of you may have read recently that not only the old jobs, but some of the new jobs are being lost. Atari (Warner Brothers Corporation) had also exported 1,700 jobs to Taiwan to make at least some of the material that goes into their systems.

I don't share the radical view that we will become totally an information society. There's a very large infrastructure in our nation built around the need to grow, to make things that we need, to repair them right here.

I think of a couple very recent articles, one in Industry Week, on the steel industry. It shows great plans to build new steel plants and radical new processes in buildings, and so on, at costs of perhaps billions of dollars. That isn't happening. The steel plants if you look at them on the outside

would look the same as they did ten years ago. But if you go inside you see some radical changes going on. Here high technology is being infused into the steel making system. Inside, the processing is being computerized. The example given in this article was that if you have a 95 percent yield in each of ten steps: 95 percent times 95 percent times 95 percent ten times, you end up with a 57 percent yield. In order to get the kind of production that would compare with steel making in Japan they had to have 99.5 percent yield in each step. They are doing that by very careful integration of their manufacturing processes, using computers. I think of how that kind of thing might have been used in some of those old broken buildings that I saw as I flew into Milwaukee. Had we done that in time we might have saved some of our industries.

Furthermore, we can not afford to lose our manufacturing industry in the United States because basically it is the substantial wealth-creating enterprise. We have to support this. We read that the jobs in manufacturing are less than 30 percent and I'll cite that later, but the wealth creation value of those jobs in the country is 65 to 70 percent of the total. We just can not afford to ignore that. Also we will continue to manufacture some of what we call lower technology goods in the United States where the combination of cheaper materials resources, minimum need for capital investment, and people willing to accept a lower standard of living will keep us competitive. I think of a visit recently into the center of Wisconsin in a small town where they make manure spreaders and band saws and so forth (some of you may know the company). The decrepit old place is falling apart but they are in business! They are working away and the people in that town I'm sure are making minimum wage. Where it is feasible, we will continue to produce the lower technology goods.

The change to high technology industry, however, will overwhelm the hanging-on to the industry of the past. We had better be prepared for this change. Some of you may have read the very excellent articles in the September, 1982 issue of Scientific American. If you haven't, all of you should. This issue is entirely on the mechanization of work. The lead article by Eli Ginzberg states that in 1820, more than 70 percent of the work force was on the farm. By 1900, less than 40 percent were on the farm and today, as most of you know, there are fewer than three percent. Through mechanization and fertilizers, the need for farmers decreased in a way that would be totally unimaginable to people along the way in the process of change. We accommodated to this dramatic change in our work force over a century and a half, but you know, the path was not always smooth.

For example, a critical time in our nation, which many of us lived through, was the Great Depression where our national policy was forced to refocus on the consumption of goods as much as on their production. We were fast approaching a time in the early 1930's when the number of white collar workers in this country equalled the blue collar workers. The nature of our work and the social environment both were undergoing a major transformation at that time. I'd like to talk about that for a minute because it may be a model, a paradigm for our own times.

Today the 70 percent that worked the soil a century and a half ago now are in white collar jobs and our manufacturing jobs are less than a third of the total employment. These are average U.S. figures, but the trends certainly apply to

Wisconsin as well as other states in this region. What I want to mention though, is that these historical shifts were accompanied by an increase in the entry age of the work force. What that says is there is need for more education to perform the work and those who can't perform the work are the unemployed. Unhappily, the less educated end up as a large part of the unemployed.

If you look at the data you will see a cyclic but steady increase in unemployment in this country that has accompanied the trend toward more sophisticated jobs. We went from two percent to four percent, five, six and now as you all know in our current recession we have been as high as 11 percent average, and in some locations much, much greater. The Scientific American articles that I referred to are primarily about the transformation of industries and jobs to higher level work, with examples in agriculture, mining, manufacturing, commerce, the office, and so on.

But, there is a very important article that concludes the series written by the Nobel Prize Winning economist, Leontief. It is pertinent to our discussion today because he argues that unemployment deriving from an increasingly technical society will result in social disruption, perhaps very serious social disruption. So this brings another problem. He looks at it as a problem of income which somehow has to include those who are involuntarily unemployed. We can argue and assess blame, but the fact of life is we have unemployment and we must face it. We are seeing attempts today to temporarily "fix" the situation by prolonging our unemployment compensation. Congress has just passed a bill (several billion dollars) for this purpose, to be fed with, what else--increased taxes, and that's counter to the need for investment to create jobs.

Some educators in the social sciences are keenly aware of these problems that derive from the work of their technical peers. So the role of education in this new high technology society will not be limited to technical education. The social infrastructure and policy that accompany this change will be as different from those of the past as the horse and buggy era was from our own. Part of this will have to be a new era of cooperation between labor and management. Those who are working are going to have to accept more responsibility for those who are not. There may be an accompanying shorter work week so that more can work.

Most of all, I think, we must be producing a technically literate work force. We can not tolerate an emerging work force that can't read, write or do simple arithmetic. We have to accept the fact that computer literacy is important. People are going to have to know how to use computers and people are going to have to know how to repair them, among other things. Many of these ideas on social changes can be found in recent literature such as the book, Megatrends. Now this book is not a book written by a futurist; in fact John Naisbitt, the author disclaims being a futurist. This book is written by a person who simply reads newspapers and books and collects all of the information and says this is the way things are trending, and shows, not surprisingly, a transformation going on toward an "information society." I told you my own feeling, I think that these people are carried away sometimes. Trends don't necessarily make the final total result. One observation that gives us pause is the trend of the movement of people out of the north. Last week I told you I was in Los Angeles. While I was there I read a forecast that in the next decade, 90 percent of the growth in the United States (people and jobs) will occur in the south and west; so they leave ten percent for all of the rest of us. Nevertheless, that is not only in the newspapers in Los Angeles, it's also in books such as Megatrends and articles in Newsweek and Time and so on.

With this backgound now I want to turn to the role that technical education must serve in this changing scene. In the so called high technology society there will still be a broad spectrum of knowledge and skills needed to serve it, just as there has been in the industrial society. Those who use word processors or program computers certainly are going to have increasingly sophisticated jobs. We are going to need well educated technicians, technologists, engineers and scientists; the whole spectrum. Because of the accelleration of change we are going to also need people who can adapt rapidly. I saw this in my middle and later career at 3M over and over again. People would not adapt, or couldn't change from an organic chemist to, say, a polymer chemist because it was so foreign, had difficulties. If they couldn't adapt, they became not very useful. We need people who will take risks, who will be entrepreneurs and pioneers. Now that's not the other guy--I'm talking to you as educators--because I think the pioneering spirit must be no less alive among our educators. The experiments must be going on there too.

The problem is that while I have been talking now to you as though all this were in the future, the need has been here for a very long time and we haven't responded to it. If we look at many of the facilities in our schools (and I include even a place like MIT) we find equipment there is falling apart or non-existent in some cases; and in some cases the faculties are unprepared. Some of the equipment is useful only for the work of the past. It's a tragic situation! Now, I'm not throwing stones at our educators. Our whole society bears this responsibility. The great challenge for our education system is coming at a time when it is under a severe financial stress. I believe our industries, our political leaders, our unions, the public, all of us--have to understand this and see it first hand and get with it!

Our interest here today, of course, is the VTAE program. But the education problem, I believe, has to be looked at across the whole spectrum. I cannot separate you from the "highest level", basic science type university, or from the universities that are more applied, such as Stout. What do we see? At this point I want to emphasize that these remarks I am going to make do not necessarily reflect what I see at all institutions. For example, I spend a day a week at UW-Stout. I think they are doing a great job in many of these areas of concern and their attitude is extremely positive.

What do we see?

1) There is very little interaction among institutions on different levels of the education spectrum. Public and private schools communicate only minimally. I'll give you a couple of personal experiences. I mentioned I had worked with Carleton and St. Olaf. The only two recent meetings I know of that took place between the University of Minnesota and St. Olaf happened as a result of some arrangements that I had made as an outsider. The provost at St. Olaf came up to the University of Minnesota and was unaware of specific interactions. He was anxious to initiate some. Now I'm not talking about the heads of the university meeting at parties or discussing things over the phone; I'm talking about very specific interactions school to school, where they are working jointly on programs.

2) There remains, particularly in some institutions of higher learning, what some call an aloofness. This does not, I'm sure, apply to VTAE. But what universities are often proud of in terms of "freedom of thought" gets misunderstood on the outside as arrogance if there is no communication with those outside the institition. And few people on the outside know how to make the connection with those on the inside. Let me give you a specific example: It has involved several universities. I have a lot to do with how one might write contracts, how one deals with patent policies when one has industry-university interaction. Very frequently I hear, "we have to maintain our virtue in the university." And one day I finally said, "We're not trying to arrange an illicit affair, we are trying to arrange a marriage for the benefit of both parties."

3) There is an unwillingness to rebalance the programs of education within schools or start new programs, at least at the rate that seems called for in this rapidly changing world that we have been talking about. What I am talking specifically about is that in the 50's and 60's when we had lots of money and freedom to do what we wanted to do in universities there were many new things started. I am going to exaggerate by naming courses such as "Basket Weaving" or the "Psychology of the Ubangis." In my opinion, we can no longer afford some of the things that we started back in those days. The unwillingness to rebalance may be in part the inertia of large institutions that are locked in tradition, tenure, self-satisfaction or bureaucracy. But in part, it is lack of resources to do the job. Again, as I pointed out earlier, this is the responsibility of all of us.

4) There is a lack of understanding in universities of the way industry works. The mission of industry is to provide service or produce products and make a profit. This rewards the investors, provides capital for new jobs and generates the wealth that supports government and public institutions, such as the schools. The mission of the university is to teach, do research and serve the public. I hope you noticed I used the word "serve" or "service" in both of those missions, but some in the universities believe interaction with industry will inevitably corrupt them. As a person sitting in these committee meetings and discussing this, I get very upset about that particular feeling. There are some in universities who believe the only reason to work with an industry is to obtain monies to make up for the dollars that no longer come from government, state or federal. This misses the primary purpose for the interaction which is synergistic action between the two to meet the needs of the high technology era: joint service to the public.

Enough of the negative. I've also seen lots to be happy about all over the country. Universities have formed task forces to deal with their problems or opportunities as they see them. Those educational groups that have been traditionally close to industry such as you in VTAE and Stout, are seeking new ways to interact. These are positive signs. So what is needed?

Well, first there must be an attitude in the schools that encourages or even insists on this interaction. The one mission that industry and education surely have in common is service to the public. If there was a time for partnership, it's now and there is a crying need to retrain our workforce and create new jobs.

Second, there must be easy access back and forth between both institutions. Fortunately in Wisconsin through a committee chaired by Bob Swanson, a profile has been compiled of recent industry/university interactions. These connections are made by people. It's a people-to-people interaction and in my own recent experience I have yet to find an industry person who did not respond to an invitation to visit one of the campuses with which I am affiliated. When your next speaker, Chuck Denny, a close friend of mine, came to Stout, he didn't just come to visit Stout, he also went to Pigeon Lake and spent a night and gave a talk to the School of Industry and Technology faculty at their annual retreat. This guy is so busy that it is an extraordinary thing that he would take the time to do that. But then there have been at least a dozen senior industry people who have come to Stout in the past year and I can name similar experiences in Minnesota. They are willing to come and get involved. Some of these visits have resulted in some very excellent follow-up interactions and new programs. Some of them haven't; and as I said before, we can't win them all; we are going to fail sometimes.

Now I want to make one very strong point: It's very important that there be mechanisms set up for this interaction. You may feel that you are already doing this, but you can't rest on your laurels! I'll never forget as a young scientist at 3M we used to have "fairs" every year where we would show off all of the new products to the top management. The president of the company, Herbert Buetow at that time, after seeing all of these great new products that the technical people had come up with said, "Yeah, but what have you done for me lately?" You can react to that in two ways, but the positive way is, it doesn't stop, you have to keep going, you can't rest on your laurels, you can't say we are already doing it.

We need new mechanisms for interaction. I know that there are personal consulting arrangements. I know there are sponsored projects, scholarships, and fellowships, but I'm not talking about those. I'm talking about new mechanisms. One very important thing is that each institution (and each VTAE district) must be looked upon as an "individual". Stout is not anything at all like the University of Minnesota or like Carleton or like the University of Washington. None of those are like the other universities and therefore, when we set up mechanisms we have to take into consideration the "character" of the institution. The education institution in my view should have the responsibility of setting up those mechanisms because each may have philosophies or modes of working that it can respond best with.

People from <u>both</u> sides then have to flow back and forth, once the mechanisms are in place. I think the most common failing of these interactions is that once they are set up they are virtually ignored by the sponsors. I will tell you a very extreme example at the University of Minnesota where I managed to get a just-retired group vice president to come over to listen to an interaction mechanism being set up there for electronics. After the meeting he said, "You know, Jim, I graduated from here 40 years ago and this is the first time I have set foot in this university". That's an extreme example, but I'm aware of a major on-going program among several industries (seven or eight million dollars) where there is the same problem; the technical people are not flowing back and forth. Until industry is willing to do that, until the university is willing to do that, until the university is willing to make a stronger effort to see that it happens, the money is not serving its purpose.

It's too early to judge the results of many of these interactions but I don't think we can afford to sit back and wait to see what the results may be. We have to keep on inventing new interactions, new ways to work together and hope that some of them are going to succeed. At Stout, the Center for Innovation and Development is a mechanism that was specifically set up to make it easy for businesses, large and small, to interact with Stout. I think it is working very well. It's getting off the ground and there are a number of sponsored programs. I was impressed with the results of the quick start programs that were reported by Messrs. Duvall and Dygert. My first reaction was that these were like "SWAT teams", sent in to serve a short but very urgent need. Perhaps in cooperation with industry, the VTAE System could develop media and means for delivery that could be quickly produced and used for quick start programs here in Wisconsin. Some of them may have features in common so that the films and slides made for one can be used for another. The education system has to develop a vision of this rapidly emerging new society. Correspondingly it has to develop a sense of urgency to act on that vision. A couple of major universities I have worked with do not have that sense of urgency. There is not the feeling that they, too, have a responsibility.

The new jobs are going to be created by entrepreneurs willing and able to take risks; and I think the educators therefore, have to be willing and able also to take risks. You can't leave a human mess in wake of the windstorms of this change. Our educators in the social sciences have a concomitant responsibility. We need to get our act together.

I believe we should think of our education system in a regional sense. We must include, I think, several states around us in our thinking, not in a competitive way, but in a cooperative way. We can't afford to duplicate facilities unnecessarily just because we are circumscribed politically by state boundaries. Minnesota is toying with the idea of improving or extending its engineering schools into the Duluth area and to Mankato and so on. They are thinking about improving or developing their industrial technology programs. In some cases that may be an opportunity for Stout to help them do that and in other cases we might ask, "why duplicate some of the things you already have?" You are doing the job; you are already sending students across the state boundaries. Each VTAE System probably can't afford to have it's own scanning electron microscope; it must become a specialist in certain areas. Another example: the University of Minnesota is trying to develop a high level computer science program and they are doing a very good job in a very narrow area. But they can't cover the whole spectrum! There is Carleton with an outstanding math department; why couldn't computer science be developed in undergraduate education at Carleton?

This idea of regional thinking is asking a lot; it requires real statesmen to work across state boundaries; it takes broad minded administrators to give up turf. I can only say that there is such a big problem out there to be solved that there is plenty of work to go around. This is the time for cooperation, not just between union and management or labor and management, but between our states, between industry and educational institituions and most especially, among and within the education institituions themselves. If we don't learn to cooperate, all of these bright forecasts for a high technology future will indeed happen someplace else. Thank you, and I hope we can have some discussion.

Question: "In this whole interaction between the universities and businesses that you work with, how much of that interaction has consisted of a university instructor actually going back into the business or industry to work and become really aware of the changes that are taking place, not on an annual basis but on a daily basis. I think this is the best area for the VTAE System to address, that is, by having management and the faculty really be up-to-date on what these changes are. One of the better ways to address them is to get people back out there and find out what these changes are." Johnson answer: I think industry should make it easier than they do for this to happen. Another less formal method of interaction is found in the CID (Center for Innovation and Development) program where projects are set up. You have this flow back and forth. The faculty person has to go to the industry and vice versa to keep the project going and alive. That's another way than someone working, say, for the summer in industry. "I'm really talking about a leave of absense for a year." And the industry, in my opinion, has been very remiss in not making that easier. I think that now they are beginning to see it's in their own economic advantage to do so. You'll see more of it, but again, I think it's your responsibility to 'make it as easy as possible.'

Question: "What is your assessment of the capacity of the older generation to adapt? Also, in my experience students coming out of K-12 programs are less prepared for adaption." Johnson answer: I feel that the K-12 system must undergo a major change. I hadn't thought of the point that you made, I'll call it a psychological point, where you are conditioned to adaptability. The K-12 program that I have been most concerned about had to do with students graduating with minimal or no math, physics and chemistry. It's appalling to talk about high technology and have students not really prepared to cope with it. I hadn't thought about this other thing which is adaptability. I guess my feeling about older people is that they can. We have to! I'm 60 and I think I am adapting every day. People who are unemployed probably feel a tremendous pressure to do something different; I don't know, you didn't say that, but I assume the individual you refer to does. Question (response): "Yes, it's quite a social frustration." Johnson: It's frustrating but I think there isn't a choice. I think they have to do it and it may be very difficult. Because as you find out our whole condition, our whole system has not really encouraged us. But I think the American people in general, historically, have been very good at adapting to change although it has been very painful at times.

I think there is another thing we have to do (and that is to change our value system). I'll tell you a little story, I was asked a couple of weeks ago by the American Ceramic Society to raise four million dollars from industry for helping the Bureau of Standards develop new phase diagrams--very important as many of you know, for new materials. This is to be a five-year program. The day I was asked, I opened the newspaper and here is a basketball player getting four million dollars in the same five years. Now, when are we going to change our value system in this country? The problem I see is that implicity or explicity we keep on giving our young people choices, so to speak, in terms of what they may or may not do to prepare themselves for something. I think of the counselors at the high schools or parents. We want to give everyone a chance to do what they want to do; but sometimes what they want to do may not be very productive. We should speak out!

Question: "I think this is the value for the whole population that has grown up in the welfare system. That's good enough because they get enough benefits so that they can have their own personal needs satisfied. This is the challenge as you try to develop an educational program for this group. It takes energy to change; it takes an effort on their part. It takes an investment on their part and unless we have some way of getting their values a little different, I think we have another societal problem." Johnson: Well, I agree with that. Let me show that the numbers I gave you on numbers of farmers in 1820 can be translated into what you are talking about. Seven out of ten people were working the farm. It wasn't because they liked working the farm, necessarily, but because the people had to eat and that is how many it took to feed themselves. You couldn't afford to have people on welfare; you couldn't afford to have criminals running loose as we have today. People had to be a lot tougher; it wasn't that they were necessarily cruel people (your great-great grandfather and grandmother) that's just the way it was. People had to work or they didn't eat. Now I think with the on-going change in our energy and resource system, we are going to be forced to come to more realistic thinking. But, I agree with you, I think that if there is a trend it will be in the direction that "people are going to have to work and be productive if they are going to eat."

Question: "Your comment on the responsibility of industry and education to serve: Black River Falls has a mining company that is phasing out in about five years. Now on the economic development committee up there the only one that is showing any interest at all in coming and seeing what might be done with that mine up there is private industry. With all of the universities we have in the state, there is no one out there willing to provide any kind of leadership at all and I guess from your standpoint the same situation exists in northern Minnesota. Who do you see, the universities, the technical institutes or the government in the picture?" Johnson: Well, I sat in a meeting two weeks ago at a university where a faculty member said, "That's not our thing to do. We are here to do pure research; we are here to advance the state of knowledge and basically we are not to get our hands dirty." And that's why I emphasized the word, attitude; you have to change the attitude first, you have to get people thinking, 'It is my responsibility to get up there and do something about this.' Until that happens, I don't think we are going to get them up here. Now, I think you and I share some responsibiiity here. I think we have to say, 'Hey, I know Joe Dokes who could go up there and do something.' You could call him up and say, 'Why don't you get up there and so something.'

Question: "In exactly three years 800 people are going to be unemployed in this community of 2,000. Perhaps where we have failed in some of these areas is a lack of state long range policy planning. Both declining as well as emerging industries need to be considered in the long term understanding of the impact they will have on the community. So we tend to be more active and then we start grabbing straws for government to help us now because we are in a problem situation. I know that sounds a little bit threatening; the state is going to come in in the future; but very often there is not the capacity or the time at the local level to do that. They simply sit and react to the changes in the communities. There is perhaps, a role for a strategic plan for states or regions. That has been very void for some time."

Johnson: That brings up an issue that I feel needs some airing. Maybe you have already done this in your deliberations. You know that David Birch from MIT critized Perpich in Minnesota for his idea that the state should do all this planning. Of course Birch is conditioned by the MIT Route 128 story where basically, people were free to start their own thing. So we have an issue of how much planning we can do on one hand, versus letting entrepreneurs "do their thing." At MIT, I might add, the state and the institution gave some tremendous incentives to entrepreneurs to do their own thing. I think this is an issue that you should not ignore. I feel very strongly that the point you are making is valid, that the state environment has to encourage entrepreneurs and business. If it isn't there, nothing happens. (We see this in research all of the time, you can have the best inventor in the world but if he or she is not in the right environment; forget it!) I feel very strongly that you should be telling entrepreneurs what specific businesses they should be in or developing. You should be providing an environment to make it happen.

Question: "You made a good point about competing with Minnesota as well as the Midwest versus the Southern belt for jobs. Maybe it could be seen in the same way within the VTAE districts. It wouldn't make any sense at all for a district to compete against another district. I think this would be another reason, at least, for a state goal, a common goal for VTAE; and then disseminate it at the district level where high technology might be identified for robotics in Waukesha or Milwaukee. Another VTAE district may represent something else. Development of those programs do exist and can be transferable to other areas that may have needs but beyond these efforts the groundwork and the basics would be done by one district."

Johnson: Let me point out an example: you just recently went through a listing of important technologies in the future of the state. I'm not by any means diminishing the meaning of this effort, I think we must do that; but looking at the results I was dismayed at looking at the relatively low score for biotechnology. I think probably most people looking at that list are thinking about biotechnology in the genetic engineering sense, that is, the research that has to do with the gene manipulation that would allow us to go on and do something else. I don't think Wisconsin should be making a strong effort in that area because there are many other people who are already way ahead of us. However, the real business that is going to come out of that, in terms of the jobs, is the use of these manipulated genes, these bugs and so forth to treat milk, to convert agriculture products to chemicals, and so on. I think Wisconsin very definitely should be highly involved in this. One or more of your schools should be involved, developing programs related to this area of technology.

Comment: "I have a couple of observations at a VTAE director. The first problem that I see is also a strength of the system, and that is local control. We have local boards but those local boards are also a source of parochialism, a decision-making process which sometimes makes it very difficult. Sometimes I wish we could turn around the balance on those boards for the employers and employees to be futurists or something of that nature. We tend to have people on the boards who are involved in the power structure in the way it exists and to change them is very threatening. It is difficult for them to look ahead,

perhaps like the seven out of the ten people who were involved in agriculture at one time would have the same kind of difficulty. I think that is a real problem for us; we are dealing with different kinds of issues than what we should be dealing with because of that parochialism."

Comment: "I have sat in a couple of hospital meetings and consortiums in terms of hospital costs. Even though they are considered to be non-profit, they have their own problems. They don't take a look in a regional sense. There is a tendency to keep up with the Joneses, i.e., if one has a CAT scan, someone else would want a CAT scan in high technology state-of-the-art equipment. In some areas it is not cost efficient. There is no check and balance as there is in industry because they can pass it on automatically to the industry or the insurance companies. There are ways to make up the overhead. They are a business and they know what their bottom line is. They know what they have to charge on a daily basis. They don't get together and it's sad that they don't get together because they are looking at their own survival. To some extent you get the same thing between high schools and VTAE Systems on a regional basis competing for declining enrollment. The incentive isn't there for coordinating those efforts. Now, can that be ironed out at the district level? Is there a need for state intervention, another big question? I agree with everything that you said this morning; one of the things that you indicated was that there is a need for educational interaction to combine risk and cooperation."

Comment: "I assure you that those two values in the educational guidelines are very difficult. We have the tendency not to take personal risks because there are not many rewards. Sometimes when we get involved in this, we want to protect our turf to the point at which we become unwilling to cooperate and we become unwilling to tell anybody what we are doing because we want to succeed. I see that all of the time."

Johnson: Now you are on a very red hot button as far as I am concerned. What I am saying is that you must develop the mechanism for cooperation. Let me give you a 3M example, and I shouldn't be talking out of school but, 3M is a divide and grow company so it became likely that product divisions would compete. We had three divisions competing to develop the tape can ceiling concept. Three separate divisions were working on that problem, call on customers. You can imagine the American Can Company's response when one division of 3M came in and then another division of 3M came in and they obviously weren't talking to one another. Well, that is an extreme example, but, in order to solve that kind of problem at 3M there was a mechanism invented. It was called the "Technical Council"; they put together a group of technical directors of the divisions so that there was more interaction. There was also a technical forum where people of all of the various divisions got together. There is also something called the "technical audit" in which the directors of each of several divisions audit, technically, the programs of other divisions so that communication does occur. We had to invent mechanisms to make it happen. I think if we don't interact, we have no way of competing regionally or otherwise.

Comments: "One of the things that Jim's comments triggered off in my mind again is that so much of technology aims at eliminating what all of us have been doing. George and I were in a meeting together yesterday (except he was in Madison and I was in Menomonie) of what was going on through the media of the

vocational telephone network. We spend a half an hour in that meeting; ordinarily, that meeting involved me driving to Madison spending four or five hours getting here and getting back and so forth. Last night, Nightline, after Ronald Reagan's talk, brought together five of the best people in the world to discuss what Ronald Reagan had said. Brought them all together for a couple of questions and so forth. If that really ever catches on, his method of education, we are all going to be in terrible trouble as we are sitting around this table, aren't we? We are going to be out of work because our whole team is based on getting a few people together in groups around us so we can talk about this kind of thing. We had a firm on the campus last week that used to have an industry in Eau Claire. This firm moved their operation to Hong Kong because their total burden on labor was $4.00 in Hong Kong. That kind of labor in the United States is $35.00 an hour. We can't continue to do it. This is similar to the Black River Falls situation. The Saturday Evening Post had an article about a fur cutter at the time that fur cutting went out of business. He was making $15,000 - 20,000; then he became unemployed. That's like your brother, John. We can't try to hang on to that and say, 'Well, we must somehow force industry to pay that fur cutter $20 an hour or that miner, whatever it is.' But we came to the conclusion that maybe there isn't enough work for all of these people if technology comes along."

Johnson: I want to take the optimistic view that I think that if we are smart, including implementing the social mechanisms, we will indeed be able to employ everybody now. Maybe it's not 40 hours a week, maybe it's 35 or something but I think we can do it.

Question: "I have a question to ask because it includes the size of a company which you have been associated with. It appears to be in my mind a sense and a lack of leadership in both private business and government. I am referring to a visionary leadership that really has an understanding or willingness to understand the unknown and to take some risks. You can see it in the ripple effect, but I see it now monitoring on insurance operations. We see it in government and in the state board versus the local board of the voc-tech, and we see it in state agencies and all agencies that collect people to make them do things. I'm intrigued because I was involved in the formation of Competitive Wisconsin, which is a group of business, education, labor, industry and agricultural leaders committed to helping set some of the tone and policy areas as well as the topical areas. I have watched that group emerge and noted how quickly it gets sidetracked in special areas and special interests, not really grappling with the long range future. I think we all have a danger of doing that and perhaps our corporate executives and government executives should spend more time preparing and discussing among themselves what we want to be and how we are going to get there instead of putting out brush fires. Legislature deals with it, government deals with it, we are dealing with it here and if this group emerges in a certain direction you are going to have other groups that either want to caboose this or cut it off or become part of it because they weren't involved in it."

Comment: "What you are really saying is that there has to be some of that leadership resource that provides a broad sense of direction, not necessarily control. I am wondering how 3M, which has been a leader in innovation, has

dealt with turf, all of the things to skew directions of an organization, and if indeed we have a responsibility here to at least recognize that because I think it is going to happen whenever we have results come out of this group." Johnson: Well, this is an extremely important point. 3M indeed has an outstanding record for innovation and maintains that status today, but like many U.S. major companies, 3M was also a victim of what I have called the "tyranny of the bottom line." Incentive systems often rewarded short range objectives rather than long range objectives. I believe there are also very urgent short range problems but--and I'm speaking now as a long range researcher--when we concentrate to solve our short range problems we tend to forget about the long range problems. We put them aside; if that happens, we are lost, there is no way we are going to succeed. Current 3M efforts to deal with this problem include a major restructuring and the increased use of strategic planning.

"THE ROLE OF VOCATIONAL-TECHNICAL EDUCATION
AND HIGH TECHNOLOGY INDUSTRIES"

Charles Denny
President, Magnetic Controls Company

Presentation at COMMISSION '85, April 21, 1983

As someone who has spent all of his life in industry, in the plant or in organizations you represent today, I have been struck with the separation that exists between industry and state institutions that are, in some large part, chartered to support industrial growth.

It may be less so in Wisconsin, but from my experience in Minnesota in both large and small companies, it is almost as if we co-exist without any links.

It's a great tragedy, since both of us must cope with current economic crisis. Industry is still in the midst of a severe recession with gross dislocation of markets, technologies and therefore employment and revenues. You are feeling the impact of the severe recession in terms of curtailed budgets due to reduced statewide taxes. We are sitting now in a common pool, and unless we find the mechanisms to work together, I think we will be in serious trouble. I hope and pray this doesn't happen.

Today, I would like to speak as a president of a small company with about $90 million in sales involved with technology. However, we are not, in my definition, a high technology company. That is, we are not basing our entire future on very large-scale integrated circuits...or biotechnology...or any of the more esoteric sciences that we hear about so much today. We do some of those things. For instance, we are involved in applying microprocessors in new products. We range from this point to basic machine shop skills.

I also would like to comment on my involvement for the past six years in what we now call the Minnesota High Technology Council. It's a group of about 60 organizations largely brought together within the last nine months. The council represents all levels of

technological sophistication. Our only definition is that the business, state agency or the educational institution must be concerned in some way with application of engineering to a product or to a service.

Since we cut across all technological spectrums, the council has become truly interesting and, hopefully, more germane to state economic development issues. We are concerned not only with electronic technologies but also with mechanical, bio, chemical, civil and agricultural and, most recently, with the medical health sciences. So we have tried to establish a base that is not insular. In the past, one group could dominate the thinking and communicate this information to the educational institutions. As a result, we miss the bets of the future. For instance, electronic manufacturing in Minnesota is the dominant industry today, but that's not to say that biotechnology may not be the best opportunity for our state's particular future development. In the council, we try to cover all of these issues.

I'm responsive to the statement that high technology is, at once, too encompassing a word and, also, too limited. It has become a buzz word which is used to cover basically all of those fields I have mentioned. Very importantly, I believe it fails to recognize the critical importance of many of the skills which your institutions are teaching. These skills are absolutely vital to our success and Minnesota's economic development.

An argument I have with many of the high-tech people - usually those coming out of university faculty as opposed to industry - is that Owatonna Tool Corporation, to use my favorite example, is as important to the economy of southern Minnesota as Honeywell's Solid

State Research Center may be to Minneapolis. If we don't provide the skills necessary for the survival and perpetuation of an Owatonna Tool Company, then we will have done an extreme disservice to a major population element in Minnesota.

We started off being called the Minnesota Technology Council but we ran into a bizarre problem - the initials MTC in Minneapolis-St. Paul, as some of you may know, stand for the Metropolitan Transit Commission. It's our bus company which is in critical financial trouble. Regretfully, we had to attach another letter.

Many of you, as you look at technology needs in the education system, have read some of the current books that are so much in vogue. Megatrends is one that has caught the attention of many people. If you have not had an opportunity to read this book, I would urge you to do so. People may question the methodology used to develop the philosophical concepts, but the presentations and the book itself have struck a responsive chord with those who work in the area of societal and technological change.

The Megatrend people came to our company recently to give a day-long summation and then engage in a dialogue with our people. They presented eight principal thoughts and theories. The major issue that Megatrends developed is that we are in a state of immense change well identified in the microcosm. But sometimes, we fail to recognize it at the macrocosmic level. Their technique is simply to look at issues as they appear in local newspapers, as reported in journals, on television, radio and via other communications outlets. Then they sum up all of these inputs, and, from that, they arrive at what the macrocosmic view should be.

The point is one that the politicans have used for years: the

electorate, in this case the population, is usually five years ahead of its representatives, those who speak for them. Importantly, Megatrends conclusions show that we are undergoing major changes which unfortunately, most of us in industry still find hard either to understand...or to believe...or certainly to respond to. Probably, it is an issue of bad medicine, and you just keep it in the back of the medicine cabinet. You know you are going to have to take it, but you keep putting it off.

The basic dislocations are, in some cases, far more complex and far more difficult than portrayed in the media, when they are summarized. I'll give you a couple of cases. When we talk technology, we used to assume that a company's defense against its competition was through its pursuit of ever increasing higher levels of technological application in its products. That was very reassuring, because you said, "Well, I will gather a group of very, very capable people, and I will develop something that no one else has. Then I will settle down and manufacture and distribute it." That indeed was the old equation.

Unfortunately, because we have all started to play that game, we now find that our products may have a product life of less than three years. Our old equation was typically based on seven to as long as fifteen years. So we developed all of our business equations, and we built our working force populations on those time frames. We invested heavily in capital equipment to produce the products. It was reflected at your level by our needs for people who are highly skilled and our needs for equipment that basically was designed to produce a similar product over several years. Now that there are only three years of expected life in a product, the equation has

changed.

Now, we have to learn to develop very quickly, which suggests certain tools like CAE or CAD/CAM. The new equation says, as we move to the manufacturing floor, we really need to develop flexible factories. We're not going to be in production very long. Our capital costs might ultimately be the same, but, in our case specifically, instead of buying a battery of screw machines and establishing a heavy tool room, we basically have to design computer-controlled assembly and manufacturing equipment. So the needs that we now have from an institution such as yours have changed, and they have changed so quickly, most of us in our company and most of my associates with other companies still can't calibrate the process. We don't know whether we are responding fast enough, or whether we are responding too fast and are taking inordinate risks. We essentially are adrift. We are in a vast period of experimentation.

Just to take that point a little further, Bob Swanson and I were talking earlier about the electronic game Pac-Man and how popular it is. If you look into the companies that are associated with those phenomena, like Atari, you may have noticed in the paper just six months ago that Atari began to pull its plants out of the United States. Who would have ever thought that you could not compete with something that is basically a fairly complicated electronic assembly manufactured in California, where, by the way, they typically use what I would call a cottage industry to do most of the assembly? I don't agree with this process, but others could argue it is good. They basically are using indigent labor from Mexico, both legal and illegal. These people assemble many of these products at hourly rates that range from $3.50 to $4.50 an hour. Yet, even with that

exceedingly low labor rate and, most likely, minimal benefits, they felt compelled - in order to compete and survive - to move their plants to Hong Kong and other parts of the Far East. Two years ago, no one would have guessed in this industry that such a move would be necessary to survive. In this age, it's very difficult for industry to tell you where we are, where we are going and how various events will affect our needs.

However, if we are to attempt to identify what industry's needs are - finally reaching into the educational institutions - I would like to begin first with the basic needs of the technology industry. Again, I am using a term - not to speak only to VLSI or bio-tech firms - but to all of those that in some way use engineering-based skills or education in their processes.

Following from what I said before, we first need good strategies. Now that's a very simple statement, and, I know around our company, we spend an increasingly inordinate amount of our time trying to figure out what our strategies should be. Ten and twenty years ago, we really didn't need these strategies. Our simple strategy was just to continue doing what we were doing well at reasonable costs, covering as many customers as possible and delivering a high quality product.

We would, by our day-to-day exposure in the marketplace, change our product lines over time, reflecting customer needs. However, we had a lot of time to pick up on those needs - the needs of the marketplace. We had a lot of time to thoughtfully develop the product, and we had a lot of time then to produce it. It was a relatively simple affair.

Today, we have to begin guessing at a whole host of factors. We must ask ourselves what the societal implications and our external

environment will be five years from now. If, in 1964, someone had asked what the societal environment would be in the United States in 1970, I don't think many of us would have been right, considering what happened in Vietnam. We would have had a difficult time understanding the basic changes that occurred in the country. As companies, we now must understand how quickly technologies will move through our research labs, our manufacturing and design shops and into the marketplace.

Most of the time we are subject to a double layer, and it catches you just as it catches us if you are responding to our needs. About half the time, industry fails to understand how quickly technology works and what the implication of this really is. This is clearly exemplified by what has happened basically in the issue of integrated circuits or, more currently, in terms of the prime application in microprocessors. Very few companies in 1970 could understand the performance or the cost curves associated with the integrated circuit - and what that would mean to industry in general and to their businesses in particular. Thoughtful people said that every two to three years costs would decline exponentially. But we never had that kind of experience before. So everyone said, "That's a scientist's dream, put it aside, continue business as usual, but keep an eye out for bad weather." However, when we went from a 1,000-bit device in ten years to, effectively, the 256,000-bit device in Japan - and with a smaller chip surface - that represented a highly significant change for which most of us were unprepared. We just simply couldn't apply the intellectual extrapolation to our work-a-day world. This has changed what we do, how we do it and the scales that are required to do it.

We also need good ideas, and the good ideas within a given strategy come from people. The message I want to leave today is that what you are doing probably is more important in this totality - and in the entire educational process - than any other factor we in industry must face. We can't lockstep our way through into this very sequential incremental product development, market development process. We are facing the obsolescence of entire product lines, and in some cases markets, because of the seemingly overnight internationalization of competition. We have to depend far more on the intellectual capacity of our people than we ever did before, and I mean all our people.

It used to be possible, and occasionally still is, to employ a genius who would set all the strategies, develop all the great product ideas and come forward with a marketing scheme that no one had ever thought of before. You can associate that kind of performance with people like Dr. Land of Polaroid, who holds upwards of 100 patents. He literally thought of everything that ever needed to be thought about in the area of optics that were applied to his particular photographic equipment. The man is a genius. And, there is Seymour Cray in Minnesota who is the father of the super computer, who, all by his lonesome, effectively can pioneer new directions.

But after you run out of those two, it gets to be slim pickings. Today, not many great ventures are created by one individual. Increasingly, the process says that a whole host of people, at all levels in the company, must be extremely perceptive to their external environments and have the capacity to unlock their imaginations as to how the needs of this external environment can be better met. This doesn't imply a quantum improvement - like suddenly conceiving a

transistor. It really means doing everything we do a little better - always being in a mode to scan the horizon for the latest techniques that may be applied to the improvement process. Therein, we need far greater acuity in our vision because, (1) there is more change, and (2) because the stakes are more important. We can't develop everything internally, even in the largest corporations. Almost every corporation I know of, including AT&T and Bell Labs, has to continually survey all parts of the world to determine what may have dramatic impact - plus or minus - on their businesses.

Creative people are critical. We must have capable people who not only are imaginative, curious and intelligent, but also who are appropriately educated for the task at hand. What has amazed me, and I don't say this critically, is that, in my case, I spent 11 years at Honeywell. I had a variety of jobs - my friends say it's because I couldn't hold a job - but I never had a week's training during my stay at Honeywell in any one of those jobs, not one. I was simply led from one department to another, given another desk or office and told, "you are now such-and-such, please be productive." Hopefully, with time, I was productive, and, in retrospect, I realize that Honeywell paid an immense amount of money for my education - an education that could have been obtained at a far lower cost and in far less time.

I look at our own company and at many other companies with which I'm familiar. I look at my friends from the High Technology Council - typically presidents or vice presidents of research and development. We know that we are not providing the necessary training to make our people as skilled and efficient as they can be. Somehow, we always end up putting training as a low priority. It is almost criminal,

and yet it exists. It exists today, and, unless something dramatically different is done, it will exist tomorrow.

There seems to be little connection between recognition of a need and the momentum to move - to develop the delivery vehicle which can provide the necessary education. More than ever, we need intelligent, dedicated people. We, literally, are in competition with the world. This is true of our company as well as the giants. No longer can we afford less than optimum output from our people. To accomplish this, we must learn entire new ways to relate with everyone in our working environment. For most of us, the hierarchical mechanisms of the past are truly counterproductive. We cannot run regimented, dictatorial and paternalistic organizations. We can't expect our people to be dedicated unless they work in an environment that supports this dedication.

We also need to control costs. Often, I am guilty of living in a dreamland and thinking of all of the marvelous things that we can do with and for our employees in technological developments - in all of the aspects of our business. But after 25 years, I know I must control costs if I am to stay in business. Unless, of course, somebody would like to subsidize our operation.

Ours is a for-profit company, and, by definition, my prime measurement is that we generate enough profit to reinvest in our company for growth. Within these costs, compensation for our people is critical. We cannot hope to out-compete and out-produce our worldwide competition through the simple incentive of salaries. There is no way our company, or any major company on earth - including IBM, can pay people enough if the economic incentive is the only incentive. Now, unfortunately, we are all caught in a common economic

squeeze. I'm sure you see it through reduced state budgets due to lack of state income.

We're looking at competing today with 50-cent-an-hour labor in Mexico. Believe it or not, you can acquire skilled labor in plastic molding-related arts in the Philippines - thanks to a UNESCO project of some years ago - for 35 cents an hour.

People are people everywhere in the world. If they are treated decently and if they are given a good education and the right tools, they are about as productive in one location as another. We always felt that if we could provide our people with far better tools and, somehow or another, a better environment, we could withstand the onslaught of inexpensive foreign labor. But most of those countries have done a remarkably good job in vocational training in chosen areas so that their workers are as skilled as ours. Whereas at one point machine tools were very expensive, very complicated and only used by a select few in these countries, machine tools now are almost all the same, are readily understood and are used widely throughout the world. The distribution vehicles for selling, servicing and training people in the use of this equipment are now so well established that the whole barrier to foreign competition has disappeared.

In short, our compensation costs must be considered. We also need to control material costs. Fortunately, in the technologically related industries, materials are not as important as a basic cost unit as they could be in some of the very low technology industries. But there is a limit to this because ultimately, as you may have noticed, the Japanese are now underselling U.S. manufacturers on the 64K chip - which, after all, is just a little bit of silicon

with some processing that's done in very high volume. When suddenly one finds one can't even defend our base in the United States over an item of inconsequential cost, one becomes very concerned.

Now, let me move to another topic. You'll hear a lot of people arguing that states should provide financing, tax credits, long-term loans or outright gifts of physical plant. That's attractive to some industries and to some individuals. If someone is willing to step forward and subsidize a new plant for a company, you would have to be foolish not to consider the offer. But I, for one, personally do not believe that most industries make site selections based on the subsidization of plant cost.

I believe most of us are looking at the quality of the working environment and the work force - plus the available training if we have to start an entire new plant. The financial facts are that most manufacturing companies have plant property and equipment costs equal to 20 to 25 percent, worst case, of their sales revenue. This means that if they are financing that investment at 10%, then they have as much as a 2½% charge against profits before taxes. So you have to put all of these factors into perspective.

Here's another issue that comes up frequently - one that you'll hear from a lot of development commissions: we must do something about the capital - the venture capital and the loans available from banks - in order to make our businesses grow. Generally that's true. Obviously, capital has to be available to all companies as they grow or, as they encounter difficulty, you'll find that capital is immensely fluid. If someone has a sound idea and a good operation, that individual - with the cost of one airline ticket - can obtain capital from California as readily as they can from their local

banker or the venture capital community. As a matter of fact, you already know there is more venture capital available in the United States today than there are ideas to finance. This situation has absolutely reversed itself. Today, if you have a good idea, have an industry you wish to start and you put the word out through the appropriate channels, you will have to bat the venture capitalists away with a fly swatter. They still will make critical judgments, but all of them are looking for opportunities.

The ability and willingness of local banks to finance small, long-term, start-up industries is of more concern than the availability of capital. However, this usually is a business equation that can be worked out if there is any merit to the idea or to the ongoing business.

If you are looking at the economic future of Wisconsin, some of the items that technology-related industries do not require are natural resources. We don't need the presence of iron ore or copper in our immediate locale. We don't rely on transportation costs as an important ingredient in our selling posture. You can ship a billion dollars worth of products in one airplane if the technological content is high enough. Of course, it must be noted that foreign competition can do the same.

While this may be a negative statement in some respects, we don't need large numbers of unskilled people. Today, the typical electronics business generates about $50,000 to $60,000 in yearly sales per employee. That's up from about $30,000 just five years ago.

For example: when I came to our company in 1970, our sales were $13,000 per employee. This year it will be approximately $55,000. What is happening is that we are using more and more skilled people, more and more capital investment and fewer and fewer unskilled people.

Our company employed 432 people in 1970 with sales of $6 million. This year, we have about 1,700 employees and our sales will be around $90 million. Our sales have increased about 16 times, but the number of employees has gone up a little less than five. Obviously, something is happening, and it points out we are using a different mix of people.

Finally, we don't need the amount of energy that is typical in many non-high technology businesses. This has become a critical factor in the state economy.

From all of those needs in a typical technology business, I hope you can sense that the most important ingredient is people. I am absolutely convinced of that; I know it with every fiber and bone in my body. To put that into just one more perspective, if you look at the cost elements of a typical manufacturing/technology company, you will find that the "people cost" is somewhere between 40 to 50 percent of the sales dollar. That says that it usually is more important by a factor of two than any other identifiable cost. So, if one is a prudent business manager and is intent in improving a company's performance, you go to work on the most significant factor, particularly if it is more significant by a factor of two than any other.

A few comments on people management. If people are the most important ingredient, how do we secure the optimum results? How do we improve our competitive posture? How do we grow businesses, etc.? First, there has to be a freedom to contribute. That hasn't always been the system. Industry was and still remains in the large part very hierarchical; hierarchy always creates barriers; barriers are walls which block communication; if you block communication long enough, people stop contributing. Those of you who were enlisted

people in the services remember that there really was no need to volunteer or ever make a suggestion because it would never be acted on by those above. The assumption was that if you were at a given level you really didn't have the intelligence to understand enough to make a good suggestion. We have to change that. There has to be a reason for people to contribute; there has to be a stimulus or receptivity in an environment that says, "Hey, your ideas are important," or "Your efforts are important." That means a lot of feedback. and we're not good at that.

In industry, there is a real polarization between those who think and those who do. We need better mechanisms by which one can contribute. Even if people do want to contribute and there are good reasons for them to do so, we don't always provide the conduit through which all of that can be fed up and fed back. Something has to happen from it. Unfortunately, a lot of us have set up suggestion systems, meetings, etc., but there is no mechanism that really works and in time, of course, that turns out the donors. We have to provide our people with the tools to be effective and efficient. They're smart enough to understand that if we cripple them in their best efforts to do a job then, in time, doing a good job really doesn't mean anything. Management is saying, in effect, "We don't care enough to make you as competitive as you must be against our foreign competitors."

Finally, we have to provide a mechanism that develops the individual's capacity or capability to contribute, and that speaks to education. There has been a lot of recognition of the freedom, the reasons, the benefits of so-called participative management. But I maintain that in the most critical area - the development of

the individual - we have done almost nothing. My experience at Honeywell, which is a great company, is rather classic. You just do the job and you'll learn enough in the process to perform adequately. But the measurement of adequate is compared to the same people who have the same lack of training. The real issue: is that group's performance competitive with those who have been trained, who are dedicated working somewhere else?

Most companies have failed to invest in training mechanisms. Most of our employees have had just a general education as they came into the business world. We have picked up a variety of skills in a very unprogrammed way. We have assumed that a general base together with pragmatic experience will provide outstanding performance. I question that. In specialties such as engineering, technology is moving so rapidly that one's knowledge can be obsolete five to eight years after graduation. If you realize how hard we fight to recruit the very best engineers and then effectively do nothing to maintain that skill level, it's a costly investment. Our behavior is almost masochistic because we simply fail to recognize the facts and do something about them.

This is even more germane now because the pace of change is really accelerating. In the case of displaced workers, we have seen only the tip of the iceberg. First has come vast structural unemployment such as from the demise of the smokestack industries. But even in a company that is relatively modern, the computer-aided engineering revolution is under way and will have a dramatic impact on drafters. Drafters are people who heretofore were always in high demand and whose profession was considered to be fairly safe. How many drafters are you training?

Five years ago drafters were in exceedingly short supply in Minneapolis. Even three years ago, just before the recession, a draftsperson could earn a salary of $25,000 a year and pick the company at which he or she wished to work. Even in a company of $90 million, we have two CAD systems, one with four stations, another with five; and we are replacing in some large part both of those with two new computer-aided engineering systems. Our engineering departments are now forecasting they will need no drafters in the entire company one year from today. Five years ago we probably had 30 people employed in drafting.

Has that been reflected in our planning? Have we relayed that to you? Have you been able to convince young people that, beware, this is a disappearing occupation? The other side of that coin is, are you prepared to teach the skilled operators we will require on the very latest equipment, not a CAD system purchased last year? I mean a full-up computer-aided engineering system. That's where we are going.

Robotics? There are a lot of robotic devices and nobody knows how to use them, program them or run them. Nobody knows how fast robotics is going to take its place on the manufacturing floor. The problem is, our engineers can understand that a robotic device is a great idea. Unfortunately, they are never available to maintain or to program. Who is going to do that work? What's the timing? Our offices will be automated. You talked about word processing; we have 60 personal computers and a battery of very large machines.

Who is providing the training for personal computers? Fortunately, we do have a vocational school located close to our main office. But in our remote plants that same education is not available and we can't

afford to move our people around the state in pursuit of that relatively low level training. The internationalization of the business world is creating vast changes not in how we would like to operate but how we are going to be forced to operate. That is going to cause a radical dislocation and change in our mix of people.

We are increasingly forced into heavier and heavier capital investments to make people more productive since the hourly rate does not have a dramatic impact on the cost of the product. We are substituting capital for labor and it, too, has a cost. It has to be purchased; it has to be advertised; it has to be replaced and that's having a dramatic impact on employment. When people campaign on the theme that high technology is really going to be the answer to unemployment problems in Minnesota, I shudder. Yes, it will generate large revenues and from those revenues, hopefully, taxes that the state can redeploy to somehow or other care for those who will not be employed as they once were.

We are not people intensive and the whole drive is to become less people intensive. My goal is to increase our sales per employee towards $100,000 as fast as I can go. I would like to do it with the same number of people I have today.

That won't provide many new jobs, and technology companies usually have very young work forces: our average age is 34 and we are not atypical. Another example: statistical quality control is sweeping the country and companies are beginning to understand that they must move to this process.

This is a golden opportunity for vocational educational institutions, because we must train every person in a company. We all have to share a common educational base. Our company itself probably

cannot educate 1,700 people at eight different locations. We want to be able to use the vocational training institutions in our locations. Finally, in terms of change, even in manufacturing companies you can sense that the shift is increasingly from people who make things to people who manipulate information. So even if a manufacturing company grows and its total population increases, more and more of that population will be in the skilled information processing area.

How do we attack this educational problem? We have decided that we will put aside "x" percent of each individual's time to be spent in education. We have indeed begun that commitment with engineers, stipulating that ten percent of every engineer's working time will be dedicated to education or re-education, depending upon the field. Obviously, those percentages will vary according to occupation. It automatically increases our engineering cost by ten percent. Short-term, that will be true; long-term, I expect that we will be far more effective.

I would expect our cost of engineering to decrease, but that's a belief. So too, is a commitment to quality, to nonpollution, to caring for employees. Those are all beliefs; none of us ever can hang a dollar on them.

We have to understand the educational delivery systems that are available to us. It's amazing how little we in industry know what institutions are there to provide education to our people. We have an excellent technical institution, one of the best in Minnesota, only three or four miles from us. We have used them heavily in certain areas, but departments right along side those that have had great success somehow or other fail to respond to the

same stimulus. It's a very bad communication process.

We have to look at the use of technology; computer-based education is coming, and it's coming in Minnesota faster than probably anywhere else in the country. That's attributable to simply the interest of one man, namely, Bill Norris of Control Data, who is a prophet and a believer and has a vested interest in computer-based education. He, by himself, will drive a large part of the educational community, largely unwillingly, into the use of computer-based education. Right now all of his courseware is regularly and perhaps correctly attacked, typically by university faculty. But, the longer that those programs are out there the better the courseware becomes and the more demonstrations are given to users of education; not deliverers. The more people are saying, "Well, that makes sense, let's try it."

Now that can change the delivery system and it's up to the educational institutions to determine what part they want to play in computer-based education. I am convinced with time it will be used extensively in industrial training, and if it isn't available from the delivery institutions, companies will furnish it themselves.

In Minnesota, we have tried to take a look at the entire delivery system and to position each element. That proved to be an overwhelming task and we have only really begun. As always, anytime you sit down to look at a problem as large as this one, it develops that there have been at least 100 task forces created in past years, typically by the Governor, that have done good work, delivered the report, and disbanded. The report is declared obsolete, particularly if there has been a change of administration. The educational institutions have participated, but usually it is on a horizontal basis; they do not relate to business.

Minnesota has four public education systems; the University of Minnesota System, the State University System, the Community College System and the AVTI's. Each reports through different channels and all are at war. And, of course, there's friction with the private college system, which is very important in Minnesota, and our high school and grade school structures. So as we try to sally forth and assess the delivery mechanisms available (technical education which is the only area in which we looked), we found the scene so confusing that it will take us another two to three years just to understand it. Straightening it out is probably a job of a lifetime.

But we have started a consortium working on K-12. The particular drive there is to ensure that remedial education is not delivered at the post-secondary level. That is chewing up a large part of our technical teaching resource in the university systems. There is sympathetic response by many to that thrust. We have yet to get on into the Minnesota AVTI's; we are waiting for a political decision. It is proposed that AVTI governance be melded with that of our community colleges.

We are facing, as are you, a possibility that a number of our institutions will be closed: the community colleges, AVTI's, or some of the Minnesota State University System, maybe even parts of the University of Minnesota itself. That's a critical issue of governance, one which has to be decided before people can begin to make meaningful recommendations. We're examining the liberal arts colleges for their scientific content. Because of the work done at Stout, it's been proposed that the State of Minnesota concentrate more heavily in the engineering/technology degree area. Frankly, we have not struck a responsive chord because our system fails to understand the location,

the placement of that very specific skill in the hierarchy of skills required. We've examined the classic four-and-five-year engineering programs, where people feel more at home. A proposal in the Minnesota legislature to commence engineering programs in three new schools has made it through one appropriation committee. We had supported two schools; the third one was added for political reasons by others. We're looking, obviously, into the graduate and research program areas and finally the competitor, the in-house programs.

Many of you know that industry spends billions a year on industrial training. That suggests that the public delivery systems have not filled a need. So we, as taxpayers in industry, so to speak, are funding the public delivery mechanisms at the same time we are spending billions of dollars duplicating the same type of training within our hallowed corporate halls. If anyone asked at a board meeting, "That is absolutely catastrophic; why are you doing it," I couldn't give the answer, unless it is bad communication.

One of the concerns we have is the failure of industry to recognize the problem, and I say that with great shame. Industry feels that it is a paragon of problem analysis, needs identification, problem solution. I don't think we have even begun to understand the nature of our educational needs and the ways to solve it. When industry has identified needs, it has done so in a qualitative manner; it has failed to quantify the issue and then to articulate it so that others like yourselves can hear and respond.

On the table is the Minnesota High Technology Needs Analysis, a color brochure. That, at least, was our attempt in Minnesota to reach out and say, here are the kinds of professions to which you, the educational delivery mechanisms, should be addressing your attention.

This is what we think we will need, by degree, by year. It's a tough issue, it took us two years to get that dog-gone thing done. The data collation process turned out to be a nightmare because nobody ever fills in questionnaires the same. We originally intended to include some data through 1991, but decided not to because we weren't sure of its validity. At least it allows us to say, in the para-professional areas, here is what we need by type, and in the degreed professional engineering area, here's the output needed from the schools. It's only a first step; we need to redo it every two years. But interestingly it has more validity than anything that has ever been published before. It's hard to mount that kind of effort; it took about 50 people a long time to put that together; but it has to be done and only industry, I believe, can do it.

There is a nonresponsiveness of educational institutions sometimes to the identified needs. You may want to respond, but you may be inhibited by your own process, your own past or by higher authorities. There is almost a tragic open war in Minnesota between certain elements of industry and the University of Minnesota. Industry is absolutely convinced that the faculty at the University of Minnesota is unconcerned with the state's economic needs and is, rather, spending its time in pursuit of knowledge for knowledge's sake. I happen to agree, because I am a liberal arts graduate, that the pursuit of knowledge for knowledge's sake is critical and certainly I feel it is very critical in terms of basic research in the basic sciences; but there has to be some better mechanism that allows industry and education to work together.

We have created a wall that has been a disservice to both parties; we have yet to breach that wall, in my opinion, at the University of

Minnesota, to name but one case. If we don't breach it, in my opinion, within the next year or two then industry will turn to other educational delivery systems for fulfillment of its needs. The creation of two, now three, additional engineering programs in the State of Minnesota partially represents that kind of response by industry and the public at large to a heretofore captive position of the university. People have to rethink their roles before it's too late. You have spoken also to the duplication and result in waste of resources. I was delighted to see that your governor and ours finally have gotten together and talked about the sharing of a limited resource, to ensure that if specialties are required we do it just once in the region.

Jim Johnson (a very thoughtful individual whose paper you have before you) has been arguing that we should regionalize the whole educational process; I believe we should. Minnesota cannot support any longer all of the specialties required for its survival economically as a state; nor can Wisconsin, Iowa, North Dakota or South Dakota. You can't run a great electrical engineering school without having a great research facility and that term "great research facility" is $25 to $30 million. For without that facility you will not attract the superstar leaders, who bring with them the first-class faculty that in turn attracts the graduate students, all of which in turn showers down on the undergraduate education process. But if we don't get together, the whole region will be without, and we will all suffer. So somehow or other, as you were addressing high-cost programs to be offered by a district for statewide use, we have to make political compromises; we all have to give up a little something. I think this issue is just now beginning to be appreciated by those with vested interests.

That leads me to one final statement. Some of you may have been to the Governors' Conference of Minnesota, Wisconsin and Michigan in Superior, Wisconsin. The speaker, David Birch from MIT, was brought back to Minnesota for Project Wellspring's anniversary. Wellspring (which is a consortium of a whole variety of organizations: business, labor, MHTC) had been addressing statewide problems. A variety of proposals were being put forward to the legislature for tax credits and financing of business. Birch's final comment was, "You can talk about all of that but there is only one thing that counts, it's education, education, education." The rest of it is window dressing - I agree with him as a business person.

Question: "I share my frustration with you. I agree with everything you say, but I also believe that the easiest thing for us is to address the high technology areas. I think it's easy for my institution to point out the engineering technicians because we get students who have talent and industry communicates what the competencies for that task will be. I think that's manageable. What I can't cope with is what I experienced last night when I had a thousand unemployed workers at our institution, and we are trying to give them the foundation to begin to address what tomorrow might be like. Our challenge is to take an unemployed 45-year-old injection machine mold operator and quickly, in a month or two or three or four or five, turn that person into the computer aided design draftsman you asked for. I see it as an impossible task. Can you comment about the frustration of taking the skilled worker and retraining him for future employment?"

Denny: You can't force good performance from people who don't care for the skill that you have assigned or the job to be assigned. You can't make me into a good cook or into something else that is not particularly attractive. When we look at retraining within companies typically, we wait for people to surface, who really want to do something and then motivation tells us that the learning process will be quick. If we take others and just say, "I'm sorry, that whole department has been replaced and now we are going to parcel you out into new areas and train you to do this and that." It's the same problem we find when we are children. You don't know what you want to do until after you've tried a number of things. I don't believe you can take the displaced steel worker in large part and turn him into a computer programmer. You can probably take somebody out of the tool room and turn them into somebody who is sympathetic to an automated factory. I hate to make this comment, and I fear it, all of industry, the job source, has historically changed. It is just undergoing a faster rate of change now than ever before and as it changes, whole industries, whole companies, whole skills, are obsoleted. When companies are obsoleted, there is a loss to its shareholders as well as its employees and in our investment mode we understand that there is continual change, that things go up and things come down. The problem I face as an employer, is that I always have the thought that every new day will be better than its predecessor and that means that every year my people's wages will rise, their conditions will improve, their security will increase. That's my goal, but that goal is flying in the face of history and what I know to be really true.

We have a great problem in the City of Duluth, because of the iron ore situation. Duluth wants to start high-tech industry in the environs and so its first move was to acquire a full-up institute of technology, and failing that an electrical engineering and computer science double major, which may or may not be the place in which to locate the new programs. Their hope is that such programs will nucleate new businesses. In a rather large public forum in which this was being debated, finally somebody from Minneapolis stood up and said, "Well, that's a nifty idea but there is one thing that you don't understand in Duluth," and the Duluth mayor said, "well we understand everything, but what's that?" and the answer was, "Well an electronic industry in the start-up mode pays about $4.00 an hour." And every worker in Duluth, and even those displaced, believes that the beginning rate is $25,000 a year, for the sake of argument, $12.50 an hour, because that is what they are accustomed to. Now the dramatic social impact is..., and the question is unanswered. Are people willing to take retraining from steel work to learn to do electronic assembly and begin work at $4.50 an hour? Thus far in Duluth, no. It's a mind set, a problem for all of us. So when you say, how do you take those displaced workers, I don't know; because the problems are so intense; and you are sure there are going to be jobs for that particular skill for which you have trained. Will there be a permanent class of unemployed?

Question: "I would like to enlarge on that particular question, we have faith in the past that automation took away some jobs but in various ways there were a lot of new jobs created and

this has come about even though there were people who felt that 25 years ago that would not happen; it has happened. Are you suggesting that in the future it is much less likely to happen than it has in the past, there we are no longer assured that jobs lost in one area would be offset by jobs created in another area? If so, do you know of any work being done in the direction of trying to figure out a different system for distributing the wealth of the nation other than through the salaries and wages we now have, primarily?"

Denny: The first part I can comment on, the second one I can't; really I have been part of this process for years. We introduce new products that are labor saving; and we of course all say, "Gosh, that will create unemployment as we obsolete various jobs;" and that didn't happen. The computer was the best example; the computer was going to replace thousands of clerks; and low and behold you spend millions on computers and you ended up with 2,000 clerks. But that was because we never used the computer right. We used it only for it's very simplist functions. Now all of a sudden when you take a computer and you use it for computer aided engineering system, you can see that it is replacing people. It does not create additional work. What has happened and a lot of us in technology industry have said, "Well, we are creating a lot of new jobs while at the same time our product is obsoleting others." We are not contributing to the growth of our economy. But in fact, you have to look at the next step which is the internationalization of the process. You are going to find that more and more of that job creation portion, which is basically at the manufacturing

element, is not going to be in the United States. If you look across the border into Mexico and recognize how many assembly plants have been set up by U.S. companies in the last ten years you will understand that that's where the new job content is going for the basically lower skilled levels; and that only the knowledge intensive portion has remained in the United States. There are a number of associated economic schools of thought that say that we will never provide the same employment levels in the future that we have in the past as a country as a whole. There are as many suggestions on how to handle that as I suppose there are speakers. I don't know what the answer is; I really don't.

Question: "One of the issues that we are addressing in COMMISSION '85 is the importance of schools retraining of workers. Some of the problems that we are encountering in customized training involve lack of resource planning on the part of a company. Do you have any suggestions for us as we go out into industry to encourage them to start looking at this sort of thing."

Denny: You have hit a very critical point and that's a very soft side of the corporate planning process. You see all of the books and hear all the talk, but most people in their heart of hearts will tell you that the corporate strategic planning process is 90 percent fluff and ten percent fact. Of course anytime you are looking into the future you have engaged in a highly dangerous enterprise. The only way that I've seen that all come together is that the president of the company says, "Manpower needs and their training is a critical aspect of this corporation's growth and

therefore within a company, I, the president will insist that we integrate the marketeers' vision of the future, the engineers' time schedule to develop that product, the manufacturing department's statement of changes and skills and the numbers of people required to produce it." All is part of a time frame. We try to do that, lay it out in detail. Now the personnel department couldn't, as you pointed out, do that by itself. It needs engineers and the engineers can't do it without the manufacturers, and so forth. But even with the best of efforts, it's amazing how inaccurate it is.

Question: "Do you take a step further and look at your people, for example, that drafter who may be displaced. Can he get the proper kind of training to move on to other jobs in the company?"

Denny: We have been doing that informally within the departments. Now we are trying to elevate it into a total company program that identifies corporate wide needs. We don't have that many people, 1,700 you can handle and you almost know them all. We will have that basically about a year from now; it will be quite detailed.

Question: "As a vocational-technical person coming into your company, what would be your recommendation for the most feasible way for me to approach you and try to get this kind of information?"

Denny: We still would rely on the vice president of industrial relations to reflect the planning document to the vocational-technical school. But it's a very bad process no matter how hard you try. I want to comment on one of the answers made to an earlier question. This is just a philosophical statement. I feel very badly that, by virtue of all of these complex drives to increase the revenues of

the company, to increase the stake holders of security and wealth, to remain competitive in the industry by maintaining market share, to increase our size so we can fend off foreign competition, all of those driving forces may cause us to effectively provide fewer jobs per unit of our companies revenues', than we do today. My thought process, and it's shared by most of my friends is, "Well, the least I can do is that I will try and provide, if you will, guaranteed employment to those I have." That's the only group I can really be held accountable to and if you make that thought process and commitment then it commits you to retraining. Because you know that the work composition is subject to radical change within at least a five-year period and if you are going to freeze where you are it says you will have to have your people in reeducation continually. The tragedy of course, of that kind of thinking is that it doesn't do anything for the new entrants to the labor market except by attrition of our older employees and it doesn't do anything for those that are structurally displaced and are looking for new employment. It's a philosophy of taking care of your own but that's parochial and I don't know what other answer you have.

Question: "Charles, do you see in the future innovation and technology change and advancement emerging out of small organizations rather than the large?"

Denny: The statistics state that the largest number of jobs created in the United States come from small business, but remember that includes a boutique and a hamburger stand as well as a technology company. The other statistic is that new ideas are generated at about five times the rate per unit population in small companies, as

they are in large. I think that generally is true. But I think you have to trace the whole process, the true breakthroughs come from research technically accomplished in a university-like environment if not at a university itself. And a university-like environment would be Bell Labs and there aren't too many of those. The application development of basic research is again either at a university or in a great research house so that a Control Data would have a very important research department and a Honeywell and so forth. That takes the idea of the breakthrough for the basic through the applied; now you are close to product development. At that point the entrepreneurs tend to enter in. They usually either have been working at the university or in a large corporation and they recognize the value of something that is not going to be commercially exploited obviously by the university, and often times not by the large corporation whose interest lies in another field. Then from one of those two sources, out they pop. That starts that small business nucleation process and leads typically to the phenomena in our city of Rosemount Engineering, Physical Electronics and companies of that nature. Then you have another generation, where because of people working in those smaller companies in an entrepreneurial mode, they get so accustomed to that kind of excitement and the possible rewards (if they are driven that way) that they will go out and find an idea. It isn't one they have been working on; it isn't even something they know anything about. They just become born entrepreneurs. Interestingly, the psychological or sociological studies of entrepreneurs recently published indicates that there is

only a tiny percentage of them that really do it for money. It's just a tummy-driven need to create, to do something, or to manage something of their own. The financial reward is inconsequential. So I do think because of just a couple of other facts you are going to see more. One, it's the buzz word. It's very highly encouraged and you will find it is included in one of your statements here. Every one is trying to stimulate entrepreneuralism. That's difficult to do. It's a psychological environment that most of us don't know how to handle. Minnesota Mining uniquely has done it within their corporation through what they call a corporate entrepreneur. There are mechanisms in the capital markets that are making it easy for a person to jump out and start a company with almost no risks; but if it fails it's all investors' money and industry has become accustomed to people coming and going so that when an individual leaves and fails and then says, "Hey, I tried it and it didn't work out, can I come back?" We almost always say, "yeah, you are a very talented guy and we are happy to have you." So it's almost a no-risk proposition. That has stimulated more of that growth. I think you will see more.

Question: "In case you feel like a voice in the wilderness, I read an article I thought was quite unique in articulating these things well and it ties in very closely with what you were saying. It's by Robert Reich, who wrote in the Atlantic Monthly March issue on "The Next American Frontier." His thinking is we have been the masters of high volume standardized production and the third world countries are not beating us at our own game for various reasons.

What we must now do is to get into flexible system production, which entails major revisions and re-organizations of industry, labor and government, and would be very painful.

Denny: I agree with that. The factor of time is a defensive mechanism in protection of a market. If a customer's need is represented by new technology or new products than he who is typically co-located with the customer has the advantage for a period of time because there is a lot of interface between the user and the provider. It's only when a product then steadies down into hard tool production that that interface is broken. It is no longer necessary on a day-to-day basis. That's when it is then possible to take that product and move it to Hong Kong and have it assembled at the lowest possible cost. If you are going to play with time as your defensive mechanism then it has to admit that you are going to be vastly flexible. We, for instance, have discovered to our absolute horror that we can no longer be competitive in one of our oldest product lines because no matter what we do with the application of technology in our best automation efforts, as the product line will permit, we are competing with 60-cent-an-hour labor in the Far East. Our basic labor rate at that level is $6.70 and our benefits rates are considerably higher than what would be paid abroad, as well. So it all nets down that our burden labor (I think many of you understand that term) is about $12.00 an hour and that burden of 60 cents an hour overseas, including extra management costs and transportation, is only about $2.00. Well, to show you how meaningful that is (and it just is bananas) we bid on probably the largest

volume small power supply that this country is likely to see in the next two or three years. We competed with four U.S. companies and bested all of them. Our bid was $40; the winner was $20 and that was a company using offshore labor. There was only three quarters of an hour of labor in that product and you would say, "Three quarters of an hour, gosh! Labor rates can't make that much difference." But you run the mathematics all the way through and it's just a difference in labor rates. So when the spread is that great, you're out. That told us then that our only posture then can be to engineer for the U.S. computer companies the highest reliability products which we would expect to produce for only one year, and after a year we will lose the business to an offshore source. That's a very distasteful prospect. It's reality. So we'll employ engineers and technicians and not many people in the factory, a change in our work force mix.

Comment: "Charles, I would like to make a comment, I have been listening to business executives and political leaders over the last several years. You have presented one of the most articulate, candid, perceptive discussions I have heard in a long time." Thank you, I appreciate it.

Commission 85

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

From the VTAE Economic Development Data Base

April 21, 1983

THE RISE OF JAPAN'S ECONOMY

U.S. newspapers and periodicals abound with news and feature articles about Japan's economy and Japanese-American economic relations. While these pieces cover a wide range of topics, they can be grouped under several main headings to provide an outline of areas of mutual activity and interest. Such a topic outline would include the manufacture of autos and computers and other high-tech goods, competition and trade, productivity, product quality, management style, labor relations, social-economic policies, and education.

The double whammy of sky-rocketing fuel prices followed by the 1981 recession dealt the U.S. auto industry a hard blow. Competition from Japan in the form of fuel efficient, high quality cars has made a bad situation worse. Japanese cars cost $750 - $1500 less to produce, and in a survey of U.S. customer satisfaction with 1981 models, the Japanese captured six of the top ten slots -- none of which were American. In the third quarter of 1982, while Ford reported a loss of $325 million, Mitsubishi joined fellow Japanese automakers in the competition for U.S. car dollars. In February of this year, GM and Toyota announced a cooperative production effort in a California GM plant. Although government and UAW representatives labeled this a trade concession on Japan's part, GM has acknowledged that the agreement is very favorable to Japanese interests.

The explosive growth of computers and related technologies in this country has created a very competitive domestic market. It comes as no surprise, after Japan's meteoric rise in the electronics industry, that computers and other electronic component products are a rapidly growing sector of the Japanese economy as well, and are also pressing for a share of the U.S. market. It was reported in January, 1983, that Japan had targeted communications equipment as a growth industry. The U.S. has already lost its edge on the semi-conductor market in Japan which now produces lower-priced, higher-quality components and exports $150 million worth more to the U.S. than we sell there. Japan has also captured one third of the growth area in toolmaking--numerically controlled precision tools. Japanese computer makers are barely able to supply domestic demand, but Sony and Matsushita are making production of computers a high priority and it is feared that when personal units become more standardized, the Japanese will mass produce them as successfully as they have video and audio equipment. In the race for development of 'intelligent' computers, Japan is actively seeking to beat the U.S. which is the acknowledged leader, but which, until spurred by Japan, had exerted only moderate effort in this area.

With such glowing achievements in its industrial sector, it is only natural that the "how" and "wherefore" of Japan's success receive considerable attention. A number of attitudes and practices are cited to explain why Japan's productivity--though half of what it was a few years ago--is still growing faster than that of any other developed country, and why its total GNP is second only to the United States. Japan's primary success factors appear to be managerial style, production techniques, labor relations, and government support.

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Commission 85

From the VTAE Economic Development Data Base

April 21, 1983

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

Much has been written about contrasts between U.S. and Japanese managerial styles, usually in laud of the latter. Japanese management exemplifies the participatory style--including employees at all levels in decision-making. This modus operandi, typified by the quality circle (which was introduced in Japan in 1961), gives employees an opportunity for input and a sense of personal responsibility for their work and is tied directly to improved quality and productivity.

In Japan, managers have tended to base their planning on long-term rather than short-term profits (in contrast to U.S. managers) and have invested in capital and research which ultimately have been more profitable (productive) than America's high short-term gains, lower-risk operations.

A third major difference in management style is the importance accorded to the production mode and product quality. Japan puts top talent into manufacturing rather than funneling all its brightest people into design and engineering as the U.S. does. Japanese managers understand how their production systems work and have a first-hand appreciation for detail, efficiency, and quality.

Japanese manufacturers tend to spend more time than their American counterparts developing and introducing design changes and new products, devoting considerable time to planning a highly structured and detailed manufacturing process. At a U.S. television plant owned by Motorola, Inc., every 100 sets needed about 140 adjustments or repairs when Matsushita purchased the plant in 1974. Eight years later, 100 Matsushita-made sets need about five adjustments. (In Japan, Matsushita's average repair per 100 sets is one.)

In the competition between American and Japanese cars, fuel efficiency and overall quality have been the great selling points for Japanese models. Comparing the numbers of defect-free autos at delivery, 48 percent of U.S. cars make the grade compared with 66 percent of the Japanese cars. Fifty-seven percent of the defects in U.S. cars must be repaired twice or three times, while less than 25 percent of Japanese models require more than one repair session.

Japanese efficiency measures such as just-in-time production, which reduces inventories and the need for storage space, transfer equipment, and employee time--all of which are expensive--cut costs and challenge workers to be alert and creative.

Wages of Japanese workers are about two thirds as high as their U.S. counterparts. Also, automation, which tends to reduce labor cost, is more common in Japan than in our country. Superior technology and cheaper labor are often cited as primary reasons for Japan's manufacturing success, but a recent study headed by Harvard's William Abernathy concludes that management style should get more of the credit. And Peter Drucker has observed, "Above all, there is the great strength that underlay the rise of Japan's economy in the last 30 years: the discovery of a defeated and demoralized Japan after World War II that people, from janitor to chief executive, are the only true resource of a country and of a company." (Wall Street Journal, 7/13/82)

Japan's adherence to this principle has averted some of the problems which have plagued U.S. manufacturing in the area of labor relations. The polarization of management and labor interests in this country and the ensuing adversary relationship are largely avoided in Japan where blue and white collar distinctions are minimized, management strives to foster positive work attitudes, and workers receive multiple skills training which allow them a variety of job posts and for which they are paid accordingly. Japanese labor contracts are brief and flexible, and wage demands are geared to the company's financial condition and to the national economy.

The Japanese government's overtly supportive posture toward business is frequently cited by U.S. business interests as both unfair and as an example our government should emulate.

To encourage and spur invention and innovation, a Japanese law passed in 1959 guarantees employed inventors a portion of the market value of their creations. (U.S. inventors get praise and recognition for their products, but only a one-time, token reward.) In 1967, the number of Japanese patent applications per citizen exceeded that of the U.S. The number of American patents issued to foreigners has almost doubled (to 39 percent) since 1966.

A recent change in Japanese banking practice, which allows manufacturers to finance their own growth and rely less on bank loans, is viewed with dismay by the U.S. as it increases those companies' resources and threatens U.S. banks in Japan.

But it is trade policies that draw the most fire from both sides. The depressed American steel industry is fuming over Japan's rising market share here (approximately 5.4 percent in 1980, 5.8 percent in 1981, 7.5 percent in the first eight months of 1982). Japan's resistance to U.S. imports - particularly beef, citrus, tobacco, electronics - while Japanese products are capturing such large portions of our auto and electronics markets is raising cries for protectionism in the U.S. The Japanese are chafing over President Reagan's Soviet pipeline sanctions which are seen as hypocritical and damaging to Japan's trade interests. With domestic and foreign markets hurt by the world-wide recession, foreign market access is critical for the U.S. and Japan, and trade agreements will continue to be vitally important to both countries.

Given their dedication to productivity, quality, and competition in technology, it is not surprising that the Japanese place a high value on education. Competition for places in the best schools and universities is keen, and reportedly begins in kindergarten. While the number of engineering students is declining in the U.S., it has increased dramatically since 1970 in Japan which now graduates more engineers than our country. Test scores reveal a rapid rise in the level of the Japanese, making them the most intelligent national population in the world today.

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At the same time that growing numbers of American companies are studying and instituting Japanese management techniques, Japanese corporations continue to send numbers of management trainees here for the M.B.A. degree. Their goal is to learn American managerial skills (which they consider more efficient) and to make contact with their future American counterparts.

Some Japanese also come to this country to study in high-tech fields. Mounting American frustration with Japan's trade policies and high-tech competition have resulted in the suggestion from American business leaders, such as Control Data Corporation's William Norris, that Japanese scholars be barred from our research programs until the trade climate improves. From 1974-75 to 1981-82, the total number of Japanese students in this country has risen from 5,930 to 14,020.

With so many high-quality Japanese products in our marketplace, and U.S. industrial giants such as GE and GM and 3M modeling management and production styles on Japanese methods, and scores of American companies flocking to the "Zero Defects - Quality is Free" training of Philip Crosby because Japanese competition is "driving them to it," one gets the impression that the Japanese economy itself is problem free.

Compared with the U.S., the recession has taken a much smaller toll in Japan, but employment is rising there, the economy's 1982 projected growth rate of 5.2 percent has been reduced to 2.5 percent, and exports are falling. Japan's transition to automation is resulting in lower employment and in worker displacement and psychological malaise. Only about 30 percent of Japanese workers are protected by lifetime employment agreements. The mandated retirement age is 55-58, but low pensions are forcing retirees to seek re-employment. In 1970, less than seven percent of the population was over 65. By 1987, that percentage will rise to 12 percent, increasing the pressure on pension funds and raising taxes.

It appears that Japan's economic policy of the past thirty years must be replaced. This is certainly a major challenge, and one which may result in a weakening of the national consensus which has characterized Japanese politics since World War II.

Peter Drucker points out that the West has tended to underestimate the Japanese, and that even in the face of mounting economic problems, Japan's high-tech prowess will remain a force to reckon with in the world economy.

Sources: The Wall Street Journal, Business Week, Capital Times, St. Paul Pioneer Press, The New York Times, Milwaukee Journal, Leader Telegram

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WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

From the VTAE Economic Development Data Base

April 21, 1983

DISLOCATED WORKERS

Current estimates identify over two million people in the U.S. as dislocated workers. We define "displaced workers" as individuals who have permanently lost their jobs because the work is being performed by people in another location, by machines, or is no longer needed. An additional one to two million Americans will join this category each year. New technology and foreign competition are the primary agents of this change which is a painful consequence of the shift of the U.S. economy from an industrial base to an information/service base. The relocation of businesses as a cost-cutting measure necessitated by the recession has also added to the tally of displaced workers.

Temporary job loss can be a devastating experience; permanent dislocation is even more traumatic and shattering. It is reported that victims of the Great Depression of the 1930's suffered less fear and anxiety than today's displaced workers who feel that their jobs are gone forever, and that their fellow citizens and the government are uncaring and unhelpful.

The Federal Government's role in helping unemployed and displaced workers is widely debated. Speaking to a conference on "dislocated workers" this month, President Reagan blamed their plight on structural economic forces for which he is not responsible and predicted that as the economy heals, jobs will return. He also acknowledges that retraining of workers is necessary, however.

The Federal Government is no newcomer to job training and retraining programs. Unfortunately, previous efforts have sometimes fallen short of expectations, and potential employers are often reticent to hire government-trained workers. Also, poor labor market projections have resulted in dead-end preparation: trainees prepared for a job have found that there is no such work available.

A current Federal project, the Downriver Community Conference, was started in Detroit in 1980 and will be replicated in six other locations including Milwaukee. Hoping to avoid earlier mistakes, Downriver has sought closer ties with local employers, and of the 667 first enrollees, 60 percent found re-employment--a rate approximately 16 percent better than workers seeking re-employment on their own.

Perhaps the greatest single barrier to retraining is its enormous expense. The Congressional Budget Office estimates retraining costs at $3,200 per person. Equally staggering is the potential number of candidates. The portion of the Jobs Training Partnership Act (10/83) slated for training one million disadvantaged youth and retraining 100,000 displaced workers ($2.45 billion) does not jibe with projected needs (17 million displaced workers by 1990).

State governments are also funding retraining programs, but as Chairman Clarenbach of the Wisconsin Legislative Council's Special Committee on Economic Development said recently, the $1.3 million apportionment proposed for training Wisconsin workers in high-tech processes in the next biennium is only one tenth the financial

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effort that will be necessary. U.S. Corporations spend about $30 billion annually for training and retraining. To help meet costs and insure jobs for retrained workers, it has been suggested that schools, governments, and the private sector cooperate on planning, funding, and training. The reorganization of CETA under Private Industry Councils, Inc. (PIC) reflects this trend.

As the problems of job displacement intensify, it is likely that the U.S. will follow the lead taken by several European countries of requiring employers to notify employees of pending shut-downs, and to help them retrain and relocate. Supplementary unemployment benefits might be tied to retraining.

Other barriers to retraining include employees' attitude that it is unnecessary because their old job will become available again, and their resistance to relocating--moving away from friends and relatives and a way of life that is all they have ever known. Those who do accept the necessity of retraining are often handicapped by a lack of basic skills--reading, writing and computing. In the Downriver project, one fifth of the applicants were rejected for basic skills that were so low that even the remedial courses the project offered were too advanced. This underscores another impediment to the process of retraining displaced industrial workers for available high-tech jobs. It is not realistic to turn masses of assembly workers into computer technicians or engineers. In fact, the job skills of retrained workers are often no higher, but rather lower, than their original levels; and wages are usually lower too.

For teaching basic skills, and for job specific training, we now have ideal teachers who can provide interactive, individual, self-paced, tailor-made instruction--namely, computers. Unfortunately, the cost of developing software and purchasing hardware is too great for our decentralized training provider system to absorb and we are not able at present to reap the healing benefit of the technology which has a major role in disrupting our labor force.

At this time, the vast majority of dislocated workers are blue collar. Within a few years, however, thousands of white collar jobs will be automated out of existence. Rapidly changing technology will necessitate retraining by even the most highly trained and educated. At present, engineers must take some retraining every five years or face obsolescence.

Continuing education is already well-established in the United States, with at least one third of the adult population pursuing some sort of organized learning. This trend bodes well for today's dislocated workers who must retrain or face uncertain and sporadic employment and for all Americans who will need lifelong training and learning in order to function and labor within our rapidly displacing - replacing economy.

Sources: Wall Street Journal, Pioneer Press, Milwaukee Journal, Time, Minneapolis Tribune, Parade Magazine

From the VTAE Economic Development Data Base

March 24, 1983

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SMALL (BUSINESS) IS BEAUTIFUL

Budget deficits and high unemployment coupled with the enticing statistic that businesses with fewer than twenty employees create five times as many jobs as businesses with five hundred or more employees has generated great interest in the health and welfare of small business in the United States. Growth in the service sector, advances in technology, concern for product quality, and the social acceptability of entrepreneurship give added impetus to what some experts regard as a trend away from large conglomerates in favor of smaller business organizations.

Although the number of bankruptcies filed in 1981-82 was the highest in fifty years, the recession also created an inviting opportunity for new businesses.

Nearly 600,000 businesses were formed in 1981, and only four percent fewer start-ups were recorded in the first half of 1982. (There were 326,000 incorporations in 1975.)

Many elements may contribute to the success or failure of a small business. Experts polled by INC. magazine for a report on the small business climate of the fifty states (October, 1982) rated capital resources and state support as the most important items. Labor and business activity followed, and taxes were placed last on the list of the five major factors. (Wisconsin ranked number thirty-five in this study.)

The concept of "state support" cuts a wide swath, ranging from small business preferential procurement programs, advisory councils, legislative committees, to direct financing of specific products and organizations. State government programs and policies are definitely moving in directions favorable to small business. In the past year, nine states created legislative committees on small business, for a total of twenty-one; thirteen governors added advisory councils, for a total of twenty-nine. We find a wide range of support activities among the fifty states. For example, Pennsylvania, Georgia and Tennessee are actively facilitating business research and problem solving at their state universities. Oregon has streamlined the permit and licensure process for new business. Ohio and Michigan are investing public employee funds in small companies. Arizona facilitates job training programs in selected high-growth industries only.

Analysts appear to agree, however, that a well-trained and/or educated labor force, available capital, some degree of tax incentive, and governmental services constitute a basic, nurturing environment for small business. We can further define the optimal conditions for small business creation and sustenance by citing common success factors and positive trends.

- The product or service fills a need; there is definitely a market for it.
- Plans for operations and growth are made and followed.

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- Earnings are re-invested in the business rather that taken out in high dividends.
- Service and product quality are high priorities.
- Marketing is innovative and aggressive.
- Franchising, the fastest growing form of small business, allows owner-manager autonomy yet also provides professional financial, technical, sales, and personnel assistance.
- Technological advances make sophisticated accounting, forecasting, and production equipment and services as available and affordable for small business as for large.
- Service business usually requires significantly less capital investment than manufacturing and most of the service sector growth will be in the form of small business.
- Colleges and universities are offering courses, workshops and consulting services for owners/managers of small businesses. (A national "Small Business Training Network" combines efforts of schools, the SBA, and Chambers of Commerce.)
- Free and paid advice and information are increasingly available through trade fairs, electronic news services, publications such as Wisconsin Industrial Product News which publicizes small business products and services, SBA information services and organizations such as SCORE (Service Corps of Retired Executives), and consulting firms.

Federal government influence on small business gets positive and negative ratings. As indicated above, the SBA provides a variety of services, but recent budget cuts curtailed some of these and completely withdrew tax-exempt financing for pollution control. The Subchapter-S tax bill, which is expected to be passed this year, will help small business; the 1982 Tax Equity and Fiscal Responsibility Act of 1982 compounds cash flow problems and raises taxes for smaller businesses.

The two most common reasons for small business failure are under-capitalization and poor management. In spite of the recession and high interest rates, there appears to be ample venture capital and technical-managerial assistance available for dedicated entrepreneurs who have promising, clearly conceived ideas. Perseverance is a key success factor.

Milwaukee venture capitalist Sheldon Lubar recently cited several advantages of small business over large organizations. Smaller operations are relatively flexible and are free of the government regulators, labor unions, special interests and rivalries. "Small is beautiful," he said.

Sources: The Wall Street Journal, INC., Wisconsin Business Journal, The Milwaukee Journal, St. Paul Pioneer Press, Working Woman, Milwaukee Sentinel, Business Week, and Eau Claire Leader-Telegram

From the VTAE Economic Development Data Base

March 24, 1983

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FUTURE JOB MARKETS

A number of cyclical factors (interest rates, inflation, etc.) coinciding with a combination of more permanent structural factors (new technologies, foreign competition) makes it difficult to assess the extent of short-term versus long-term unemployment and to project future job markets in the United States.

Cyclical recovery is expected to be slow, particularly in manufacturing. In Wisconsin, employment in durable goods declined 11.8 percent in 1982 and is projected to fall an additional 8.5 percent in 1983. Within the next five years, however, domestic steel production (now at 30 percent capacity) should be bolstered by higher defense spending (a projected 10 percent increase in 1983 and a 48 percent increase by 1987). An overall "recovered" economy will eventually put millions of Americans back to work.

Structural changes in the U.S. economy, in particular the shift from an industrial base to a technology/information/service base, also have a profound impact on employment. New technologies create new products/services and also change production modes of existing products/services so that we have "new" jobs, such as computer programmer, and "lost" jobs, such as auto welder. At present, there are not enough trained programmers available, but there are too many welders. Their jobs can now be performed by robots that work two shifts a day for eight years at a cost of $6.00/hour, and an average down-time of two percent. (General Motors estimates installing 20,000 robots by 1990; these will eliminate 40,000 jobs.)

If the recovery were instantaneous, it is conservatively estimated that of the 11 million Americans unemployed in December, 1982, 1.2 million would find their jobs permanently lost to automation (800,000) and foreign competition (400,000).

The belief that "high-tech" is the solution (as well as part of the problem) has captured a great deal of attention and support. States and municipalities (particularly in the Midwest) are actively vying to attract high-tech businesses. Within the past few months, however, analysts are noticeably less enthusiastic, cautioning that high-tech won't provide all the answers. The thrust of these high-tech backlash reports is that in terms of actual potential employment, high-tech has been over-sold. It is true that there is tremendous growth in the number of new high-tech jobs: the DOL reports that data processing machine mechanic jobs are projected to increase 148 percent in the 1980's; five out of six of the fastest growing occupations stem from electronic technology. There are now more jobs than trained workers available in these areas. Yet in terms of total numbers of new jobs in this decade, those in high-tech don't qualify for the DOL's top 20 list. For the 150,000 computer programmers needed, there will be 1.3 million posts for janitors, orderlies, and nurses' aides (a ratio of 1:9). For the 100,000 new jobs for data processing machine mechanics, there will be 800,000 slots for fast-food and kitchen workers.

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In the longer view of job growth, two general areas emerge: information--which includes computers, robotics, biotechnology, transmission technologies and conservation--which is divided into human (health care, etc.) and ecological (energy, waste disposal, etc.) sectors.

MIT's economist-futurologist David Birch sees the U.S. economy shifting from a base of hardware, which is muscle-powered, to "thoughtware," which is mind-powered. He considers education and training as vital to the process, with retraining of particular importance because thoughtware products/services turn over every three years. Labor, industry and education must work cooperatively in order to plan and meet training needs.

Sources: The Wall Street Journal, The Milwaukee Journal, St. Paul Pioneer Press, Forbes, Newsweek, The Minneapolis Tribune, The Capital Times

Future Employment in the U.S.

	1982	2000
percentage of work force producing goods and hardware	22.4%	11% (possible 8% if robot use is widespread)
percentage of jobs in agriculture	4%	3%
percentage of work force producing services	73.6%	89%

Marvin Cetron: Encounters with the Future: A Forecast of Life in the 21st Century

From the VTAE Economic Development Data Base

February 17, 1983

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THE SOCIAL EFFECTS OF UNEMPLOYMENT

A recent Harris poll rates unemployment as the current major concern in the United States. Victims of unemployment describe themselves as anxious, fearful, degraded, depressed. They feel forgotten by their fellow, employed Americans, and betrayed by the system that promised work to all earnest seekers.

The group hardest hit by joblessness is black teenagers. With inner city unemployment of teens estimated to be as high as 80 percent, it appears that a whole generation may never experience the skills, confidence and achievement inherent in working. This cannot help but result in higher crime rates and/or life-long dependence on social welfare.

In the total labor force, more males than females are out of work. This reflects heavy job losses in the manufacturing sector as opposed to the clerical sector. Among white-collar workers, however, more women than men have lost their jobs. Displaced older workers are less likely to relocate or retrain for re-employment, but have more stable social ties and experience less mental and physical malaise.

Because unemployment is highest among traditionally non-voting groups, is concentrated in certain areas, and is now generally perceived as a chronic problem, it has had less politicial impact than during other recession periods.

The national financial impact of our unemployment rate is reflected in the sagging GNP, federal deficit, bankruptcies etc. For individuals and families, the financial loss can be devastating, often forcing an abrupt change of life style and creating a serious challenge to provide food, shelter and health care.

In 1982, health costs increased 11 percent, or about three times the CPI for all items. At the close of 1982, unemployment caused sixteen million Americans to lose their health insurance coverage. The Reagan administration proposes to pay $58 billion less in health care over the next five years.

Unemployment also entails less obvious but consequential individual and social costs. Research has established that for each one percent rise in unemployment in the U.S.,

- the mortality rate will rise by 1.9 percent
- the incarceration rate will rise by 4 percent
- the homicide rate will rise by 5.7 percent
- the suicide rate will rise by 4.1 percent
- the rate of first-time admission to mental hospitals will increase 4.3 percent for men and 2.3 percent for women

In 1981, of 51 Wisconsin counties in which unemployment increased, 35 counties also experienced increased reports of child abuse. Of 21 counties in which unemployment decreased, 15 counties had a decrease in reports of child abuse.

Sources: The Milwaukee Journal, St. Paul Pioneer Press, and The Wall Street Journal

Entrepreneuring:

The Ten Commandments for Building a Growth Company

by Steven C. Brandt
(Addison-Wesley Publishing Company, 1982, 193 pages, $12.95)

"Technology, which has traditionally been converted by entrepreneurs into things people buy, is increasingly thought to be the United States' number one economic weapon in a tough competitive world." The ten main operating principles presented in this highly useable book are aimed at people involved in starting or managing a growth company.

Commandments one, two, and three cover key startup issues; commandment four addresses preparing a business plan; commandments five through eight deal with day-to-day operating matters; and commandments nine and ten emphasize professionalism in entrepreneuring. Brief statements of each commandment follow:

1. Limit the number of primary participants to people who can consiously agree upon and contribute directly to that which the enterprise is to accomplish, for whom, and by when.

2. Define the business of the enterprise in terms of what is to be bought, precisely by whom, and why.

3. Concentrate all available resources on accomplishing two or three specific, operational objectives within a given time period.

4. Prepare and work for a written plan that delineates who in the total organization is to do what, by when.

5. Employ key people with proven records of success at doing what needs to be done in a manner consistent with the desired value system of the enterprise.

6. Reward individual performance that exceeds agreed upon standards.

7. Expand methodically from a profitable base toward a balanced business.

8. Project, monitor and conserve cash and credit capability.

9. Maintain a detached point of view.

10. Anticipate incessant change by periodically testing adopted business plans for their consistency with the realities of the world market place.

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INFORMATION TECHNOLOGY: A Major Factor in Economic Development

In the U.S. today, sixty percent of the work force produces or processes information. Ready or not, the Information Age is upon us. The enabling technologies of this socio-economic shift continue to proliferate and to increase their sphere of influence. The following items outline some of the current applications, trends, and challenges stemming from information-communications technologies.

Of course, the computer is a central figure in the information revolution. Main frames, minis, micros...refinement and use of computer technology grows apace. The following discussion of computer information applications simply cites a few recently reported instances of information processing and dissemination.

- Storage capacity, and projection and retrieval capabilities give computers an important niche in commodity futures pits and the stock market. Information retrieval services, linked to information "utilities," supply specialized market prices and trends to subscribers via print, telephone, computer and even radio.

- The insurance industry is turning increasingly to computers to remain competitive in price and response time. The expense of automating will necessarily lead to a merging of firms, and to the demise of many small, unautomated agencies.

- The cost of computers was once prohibitive for individuals and small businesses. With lower prices (brought about by competition and the slow economy) a proven track record for boosting productivity, and increased storage, retrieval, and program capacities, microcomputers are now viable investments for families and a variety of small businesses.

- Small engineering and machine tool shops now have access to computerized hardware or software services at one-half to one-third the price of a few years ago.

- Home computer (micros) sales have greatly exceeded market expectations. Three hundred thousand units were sold in 1980, an estimated 1.5 million were sold in 1982.

Computers may also have significant impacts on management style and corporate organization. For the computer savvy executive, the computer will quickly supply a wealth of information which formerly was readily available only to the data processing manager. Direct access to information by chief executives increases the power and the pace of their leadership. It is interesting to note that, along with the rapid growth of sophisticated information technology in business/industry, people-based information systems are also gaining in importance. Work innovations such as quality circles and problem solving groups

facilitate the flow of job improvement ideas from labor to management. These "in-house brain trusts" are credited with boosting morale and productivity and are seen as human capital assets. It is, to a great extent, changes in work and the work environment resulting from technological innovations that generated the need for the human communications networks.

The "electronic office" combines computers and telecommunications to enable electronic information transfer. Inter- and intra- office communications are fast and efficient and workers may receive and transmit information from any equipped location, including home.

This flexibility may lead to a rebirth of "cottage industries" with workers living and producing at a single location - a total reversal of the commuter syndrome which has characterized the U.S. labor scene since World War II.

The rapidly expanding and highly lucrative markets for new and refined information technologies are, naturally, very attractive and competitive. Consequently, entrepreneurs and corporations the world over are scrambling to perfect, protect and market products and services.

- Soon-to-be marketed thin-film computer drives can store four times more information than the currently-used ceramic drives and transmit it two and one-half times faster.

- As we turn to video screens rather than print for information, current copyright law will become obsolete and compensation for creative work will necessarily be based on new concepts.

- Some politicians in the U.S. press for a national industrial policy to help counter Japan's governmental protection.

- Fierce foreign competition in electronics has led to the formation of a consortium of U.S. electronics companies called Microelectronics and Computer Technology Corporation. The ten founding firms pool research funds and share technology information within the corporation and with other firms via licensing agreements.

- In a recent research-technology exchange agreement between a Milwaukee chemical company and a German firm, there is no sale or licensure of information, but open communications for mutual improvement.

- To facilitate use of new ideas and inventions, Control Data Corporation's WORLDTECH division advertises new technologies in a newsletter to prospective buyers. Buyers and sellers are protected from "pirating" complications, and promising concepts get developed and used.

- Polaroid Corporation created an Applications Development Group to facilitate application of their technology in other industrial areas.

Sources: St. Paul Pioneer Press, The Wall Street Journal, The Milwaukee Journal, Wisconsin Business Journal, Business Week, Inc., Productivity Through Innovations.

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From the VTAE Economic Development Data Base

January 20, 1983

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

RECESSION

The present recession period, called the "worst" in forty years, is generally acknowledged to have begun in July, 1981.

St. Paul Pioneer Press - 9/1/82
The Milwaukee Journal - 9/26/82

GNP

The 1982 GNP has slid, climbed and lurched downard again, and will definitely be much lower than the predicted rise of 4.2 perent. The current estimated final 1982 figure, a drop of 1.7 percent, is the steepest decline since the 1940's. Forecasts for 1983 place the GNP rising three to four percent.

The Wall Street Journal - 12/12/82
St. Paul Pioneer Press - 12/22/82

LABOR COSTS

Because labor costs are such a large proportion of total production cost, a long-term slow down in inflation hinges on a slow down in wage increases.

In the first nine months of 1982, the average increase was 3.8 percent - the lowest in the past decade.

Management and labor appear to agree that in a recession, big settlements are counterproductive. Experts predict moderate increases in 1983, but worker demands will doubtless reflect any perceived growth in the economy. Major wage negotiations in 1983-4 include the communications, steel, food and aerospace industries. With 45 percent of the steel workers unemployed, and benefit funds strained or depleted, union rejection in November of what is considered a fairly innovative concession offer by the industry is somewhat confusing.

USA Today - 1/4/83
St. Paul Pioneer Press - 10/22/82
The Wall Street Journal - 10/6/82
Business Week - 12/6/82

RECOVERY

A great deal is being written about recovery. Has it begun? When will it start? How can it be facilitated?

Positive and negative indicators abound. Hopeful signs include a lower rate of inflation, falling interest rates, moderated labor costs, rising productivity, rising Leading Indicators in the second and third quarters, a vigorous stock market.

On the negative side, unemployment is still climbing; jobless benefit funds are depleted and in debt; real interest rates remain historically high; consumers and business interests are not confident that inflation is under control; bankruptcies abound; the federal deficit is growing astronomically; many states face deficits and the state and federal infrastructure is in dire disrepair; factory utilization is only seventy percent; capital spending in 1983 is projected at the lowest level in the last twenty-one years; the recession is world-wide, with many "weak spots;" international lending is slowing significantly.

There is a strong consensus, however, that recovery will be slow, perhaps at one half the usual rate. In Wisconsin, recovery is expected to lag three to six months behind the nation as a whole because our state economy is so closely linked to heavy industry which is hardest hit and slowest to recover.

St. Paul Pioneer Press - 11/22/82
The Milwaukee Journal - 10/6/82
10/19/82
12/9/82
The Wall Street Journal - 11/1/82
Business Week - 11/15/82

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UNEMPLOYMENT RATES

U.S. Unemployment History
government averages, seasonally adjusted

1922	6.7%	
1932	23.6%	highest to date: 1933 24.9%
lowest to date: 1944 1.2%		
1942	4.7%	
1952	3.0%	
1962	5.5%	
1972	5.6%	9/81 7.4% 9/82 10.1%
1982	projected 8-9%	

The Milwaukee Journal - 10/8/82

Preliminary unemployment data August - September, 1982

			WIS METRO AREAS							
	U.S.	WIS	Madison	Appleton-Oshkosh	Green Bay	Racine	Janesville Beloit	Milw.	E.C.	LaCrosse
	%	%	%	%	%	%	%	%	%	%
8/82	9.8	10.7	7.1	10.4	10.4	13.7	14.5	11.2	11.8	9.0
9/82	10.1	11.3	6.9	11.8	10.5	15.2	14.5	12.4	10.4	10.0

The Milwaukee Journal - 10/22/82

	Wis %	Mich %	Ohio %	Ill %	Ind %	Minn %
1981	7.0	11.0	9.4	8.1	9.1	4.6
1982	10.4	14.5	12.5	11.4	11.1	7.3

seasonally unadjusted figures as of 8/82

St. Paul Pioneer Press - 10/82

Three U.S. Metro Areas with highest unemployment as of 9/82

1. Youngstown - Warren, Ohio 19.5%
2. Duluth - Superior, Wisconsin 18.6%
3. Flint, Michigan 17.8%

The Milwaukee Journal - 12/3/82

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PRODUCTIVITY

Lower profit margins, greater foreign competition, the ailing economy - all point to the need for improved productivity. In an over-simplified nutshell, when productivity rises, costs fall, inflation stabilizes, the economy recovers and growth resumes.

U.S. manufacturing and service sectors are implementing a variety of measures to increase productivity.

1. Technical innovations such as computers and robots get a large share of credit for the 85 percent increase in blue-collar productivity in the 1970's. Office automation systems sales, now growing at 30 percent annually, promise dramatic improvement in white-collar productivity which rose only four percent during the '70s. Greater improvement is vital, given growth projections of the white-collar force from 53 percent today to 65 percent by 1985, and 90 percent of our total work force by 2000.

2. Work innovations - quality circles, flex time, etc. - are improving the ambiance of the work place and providing increased motivation for workers to raise productivity.

3. Cost-cutting measures such as the Just-In-Time (JIT) Production System, a Japanese innovation, boost the productivity ratio.

Unfortunately, cost-cutting measures tend to trim R & D and capital equipment budgets, too, (high interest rates take a heavy toll here), creating a Catch-22, for R & D and capital investment are central to long-term productivity gains.

St. Paul Pioneer Press - 8/29/82
The Wall Street Journal - 10/13/82
The Wall Street Journal - 11/15/82
Harvard Business Review - 1/2/82

Productivity Through Work Innovations
A Work in American Institute Policy Study - 1982

FACTORY UTILIZATION

In November, 1982, U.S. factory use sank to 67.8 percent. This marked the thirteenth decline in 15 months, and the lowest level since such records have been kept (1948). Hardest hit are primary processing industries including petroleum, lumber, clay, metals, glass.

In August, 1981, usage stood at 79.6 percent. Capacity utilization was over 80 percent throughout the preceding decade. Given present low utilization, capital expansion is very unlikely, no matter how far interest rates may fall. And if recovery is as slow as some predict (half the usual rate) capacity utilization will hold at current lows for the next several years.

Predictions of a major shift away from manufacturing jobs (19 million in 1982, three million in 2010), suggest that only a fraction of current factory equipment will be in use twenty-five years hence.

The Milwaukee Journal - 11/17/82
12/16/82
Business Week - 12/16/82

The Wall Street Journal - 9/17/82
St. Paul Pioneer Press - 11/22/82

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Commission 85

WISCONSIN BOARD OF VOCATIONAL TECHNICAL AND ADULT EDUCATION

From the VTAE Economic Development Data Base

January 20, 1983

INFLATION

St. Paul Pioneer Press - 9/24/82
The Wall Street Journal - 9/24/82

U.S. 1979: 13.3%	1980: 12.4%	1981: 12.9%	1982: (projected) 5%

Prevailing factors in the sharp drop in the rate of inflation include the Federal Reserve Board "tight money" policy, substantial decreases in food and energy costs, and a wide spread slowdown in wage increases.

Consumer surveys indicate that Americans' expectations about future levels of inflation have moderated considerably since 1980, but two thirds of recent respondents think that inflation is at least as high in 1982 as it was a year ago.

Continuing high long-term interest rates nourish fears that inflation may soar again as it has in past recovery periods. This uncertainty itself is considered an impediment to recovery.

INTEREST RATES

In December, 1982, the Federal Reserve Board dropped its bank rate to 8.5 percent. This was the seventh cut since July, 1982 (16.5 percent rate), and the lowest rate in four years.

Th bank rate hit a peak of 21.5 percent just two years ago, (12/80).

This series of reductions contrasted with recent Federal Reserve policy of tight control of the money supply, and set off a flurry of activity in the Stock Exchange and speculation on future policy. Generally, lower interest rates stimulate the economy. Critics of the Fed believe, on the one hand, that a rapid decrease in interest rates will re-vitalize the economy too quickly with consequent "reflation". On the other hand, the argument is made that lowered interest rates are too little too late and that lower long-term rates are crucial to recovery. With the current significantly lower level of inflation, "real" interest rates - the difference between the nominal rate and the inflation rate - are very high, especially for consumers.

St. Paul Pioneer Press - 12/14/82
The Milwaukee Journal - 10/22/82

FEDERAL DEFICIT

The Federal deficit for 1982 is estimated at $110.7 billion, projected figures for 1983 are $175 - $200 billion. Both are much higher than initially projected (two times and eight times, respectively). A $185 billion deficit in 1983 would be higher than all the total deficit combined from 1976-1980.

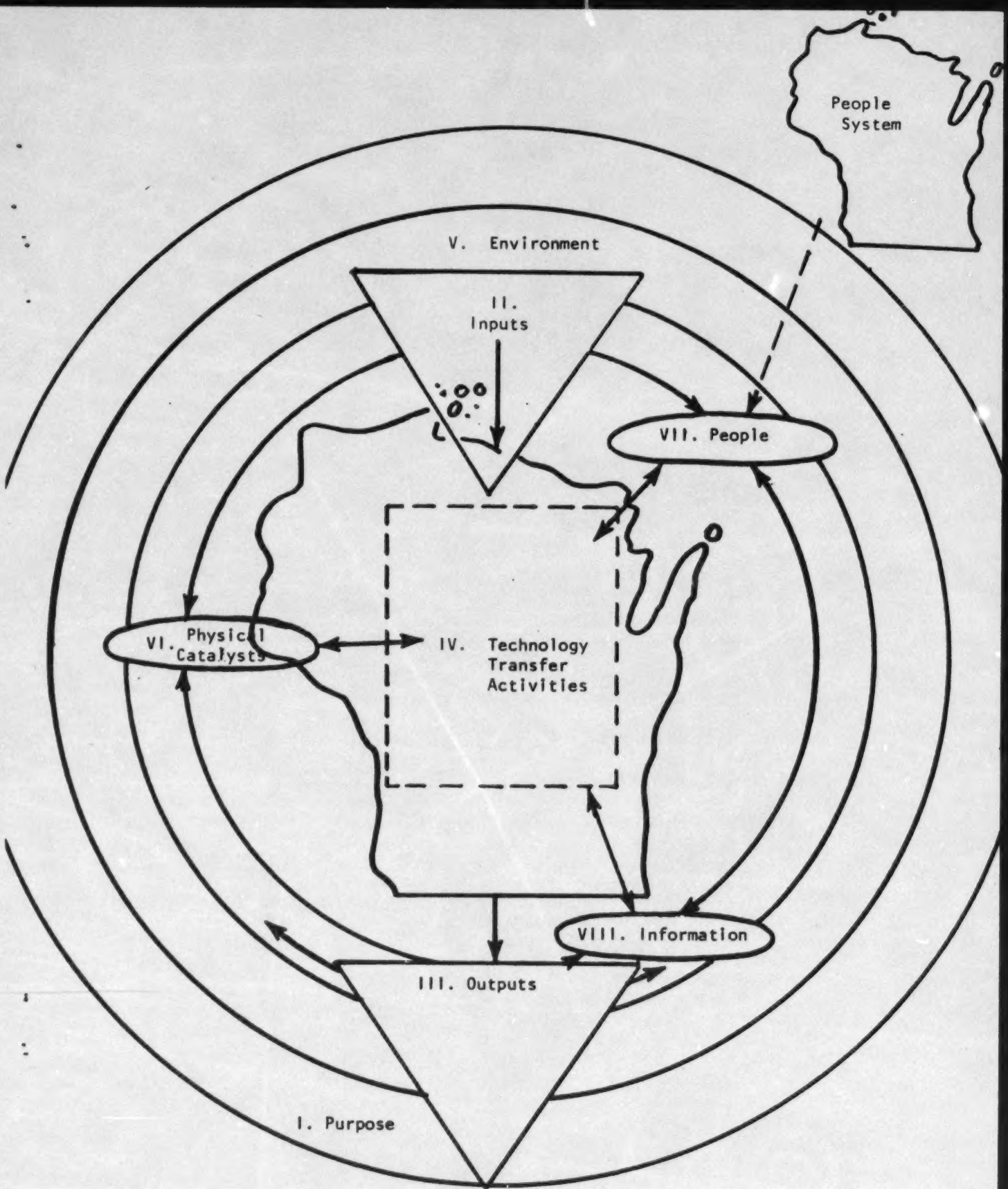
The high long-term interest rates are directly linked to the high Federal deficit and both are seen as substantial stumbling blocks to recovery.

St. Paul Pioneer Press - 9/26/82
The Wall Street Journal - 12/21/82

WISCONSIN DEFICIT

The most recent estimates put Wisconsin's deficit at $300 million by June 30, 1983, and $1.5 billion 1983-85.

St. Paul Pioneer Press - 1/12/83


People System
V. Environment
II. Inputs
VII. People
VI. Physical Catalysts
IV. Technology Transfer Activities
VIII. Information
III. Outputs
I. Purpose

DRAFT COPY
February 17, 1983

Technology Transfer System

I. Purposes of the System

A. Expand Wisconsin's economy

B. Enhance employment opportunities for all Wisconsin residents

C. Improve the quality of life in Wisconsin

D. Provide a base for future economic development and expansion

II. Inputs - Ingredients, resources, etc. that enter the system and emerge from it in a new form

A. Knowledge

1. Basic (also an information catalyst)
2. Applied
3. Technology

B. Natural resources

1. Water
2. Minerals
3. Energy
4. Soil
5. Timber
6. Wild life
7. Air
8. Living space

C. Financial resources

D. Ideas for improved and/or new products and services

III. Outputs

A. Increased productivity in Wisconsin's business, industry, agriculture and public sectors

B. Higher levels of employment for Wisconsin residents

1. Jobs available throughout the state
2. Jobs available to match the talents and interests of Wisconsin's labor force

C. A stable economic base for Wisconsin which provides the context for manageable growth and is resistant to recession and economic transitions

1. Diversified industrial business and agricultural base
2. Continued infusion of new technology in existing business, industry, agriculture and public sector units

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3. Development and/or application of new technology to create new companies (NOTE: See list of technologies and priorities identified by the Technology Transfer Committee.)
4. Expanded tax base. Reduced and equitable taxes for all elements in Wisconsin's economy

D. Improved quality of life in Wisconsin

1. Improved wage and salary scales
2. Reduction of environmental hazards
3. Improved quality and access to education
4. Improved health care
5. Expanded and improved recreational opportunities

E. More efficient and effective use of resources

IV. Technology Transfer Activities

A. Ideas for products and services originate in different ways (See Figure 1, Section a)

1. Consumer needs and interests
2. Experience
3. New technology permits the design of more effective solutions to existing needs or new products which improve the quality of life
4. Basic research creates opportunities through the development of new knowledge
5. Applied research makes it feasible to use basic knowledge in new ways

B. Financial resources are required to finance the transfer process (Section h in Figure 1)

1. Credit, loans and bonds for more stable enterprises
2. Stock and venture capital for new and more risky situations

C. Technical, business and market development for new product and enterprise follows the typical process (See Sections b-g in Figure 1)

1. Inventors and entrepreneurs may not be competent in all areas
2. Technical assistance is often needed in one or more areas
3. Adequate communications channels between investors/entrepreneurs and those who provide technical assistance are needed

V. Environment - The general economical, cultural, business and physical climate in Wisconsin.

A. Economic Climate

1. International
2. National
3. Regional
4. State

B. Business Climate

1. Competition
2. Fair government rules and regulations
3. Fair tax structure
4. Favorable public attitudes toward business
5. Availability of financial resources

C. Cultural Climate

1. Supportive of business and industry
2. Strong work ethic
3. Encourage entrepreneurship
4. Varied opportunities for cultural and leisure time activities
5. State-wide availability of quality vocational, technical and college education programs

D. Physical Environment

1. Clean air and water
2. Varied seasons provide opportunities for a wide spectrum of sports and leisure time activities.
3. Considerable amount of open space

VI. Physical Catalysts - Facilities and equipment that can help to develop, refine and produce new products and services. These need to be readily accessible to potential users.

A. Labs for R & D activities

B. State-of-the art equipment

C. Incubator space (Facilities and equipment that can be used at a minimal cost to develop and produce a new product/service.)

D. Technical resource centers

E. Education and training facilities

F. Transportation system

VII. People

A. Entrepreneurs

1. Creative ideas
2. Risk takers
3. Willing to share ideas

B. Employers

1. Management skills
2. Communication skills
3. Financial skills
4. Human relations skills
5. Willing to share ideas

C. Employees

1. Current skills and knowledge
2. Strong work ethic
3. Flexible
4. Willing to share ideas

D. Resource Persons/Consultants/Specialists

1. Technical
2. Management
3. Financial
4. Marketing

E. Teachers, Trainers and Counselors

VIII. Information Catalyst - Data and knowledge based resources used to improve the effectiveness of the technology transfer process and the development of new products and services.

A. Communications network that facilitates the transfer of knowledge and sharing of ideas between disciplines, agencies, people, businesses, etc.

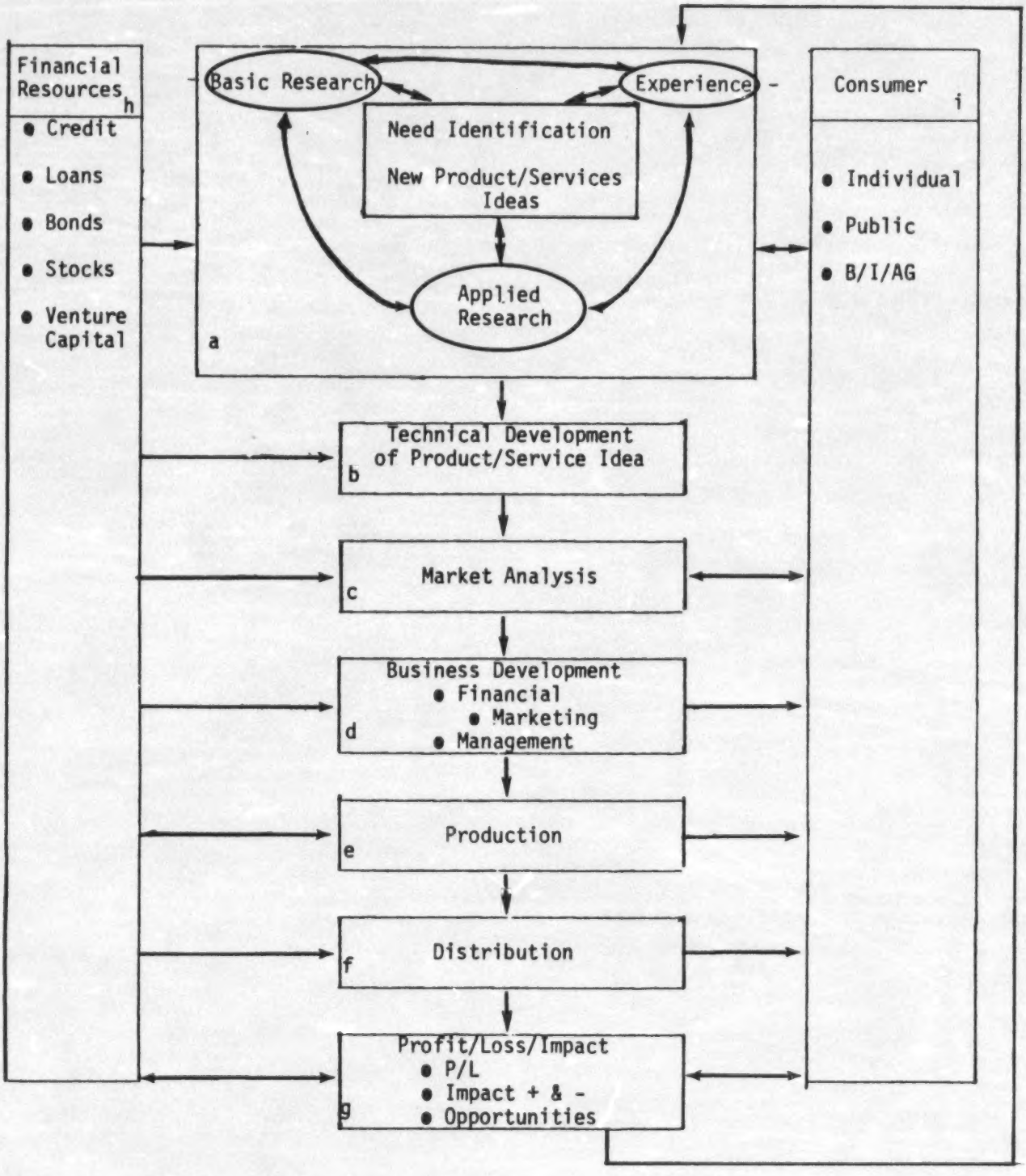
1. Communications specialists who can help translate information
2. Media specialists
3. Established contact points

B. Computer data bases

C. Technical libraries

FIGURE 1

TECHNOLOGY TRANSFER ACTIVITIES



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PEOPLE

FIGURE 2

V. Environment

- Educational
- Economic
- Business
- Cultural

VI. Physical Catalysts

- Educational equipment
- Educational facilities
- Computers
- Business/industry equipment

VII. People

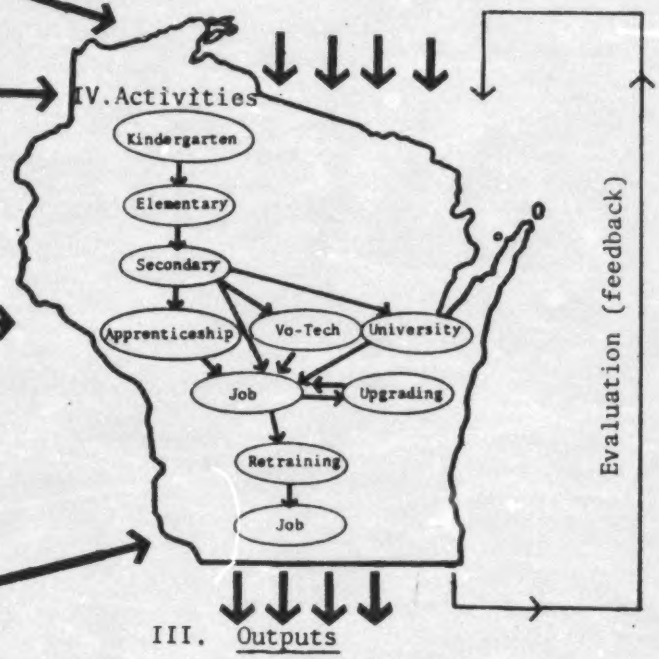
- Teachers
- Counselors
- Administration
- Managers, supervision
- Business/industry liaison
- Vo-Tech economic development coordinators

VIII. Information Catalysts

- Content of new technologies
- Processes used by people who create new products
- National and statewide data bases
- Industry projections of need for trained workers

II. Inputs

- Children
- Adults
- Handicapped
- Disadvantaged



III. Outputs

- Technical training relative to current job market
- Assistance for innovator (entrepreneur) in operation of new business
- State-of-the art computer literacy
- Knowledge about future job opportunities
- Flexibility, to adapt to change

I. Purpose

Develop the maximum human potential of Wisconsin residents. Prepare people for the information age, and expand their capacity to adjust to technological changes. Use new technology.

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ECONOMIC DEVELOPMENT
CONFERENCE EVALUATION
June 1, 1983

Please assist us in improving the quality of future conferences by answering the following questions:

1. What is your overall evaluation of the Conference? (Circle one number)

1	2	3	4	5
Poor		Good		Excellent

2. How do you rate the quality of the keynote speakers? (Circle one number)

1	2	3	4	5
Poor		Good		Excellent

3. What is your evaluation of the materials provided for the conference? (Circle one number)

1	2	3	4	5
Poor		Good		Excellent

4. Why did you come to this Conference? (Check all that apply)

Wanted to hear Charles Dygert _____
Wanted to hear Earl Joseph _____
Interested in Plan for Economic Development _____
Wanted to know more about VTAE _____
Wanted to know more about COMMISSION '85 _____
Other _____

5. Where did you <u>first</u> learn of the Conference? (Check one)

Brochure mail _____
Colleague _____
Announcement in meeting _____
News item _____
Other _____

Leave evaluation form at head table at the end of the Conference. Thank you.